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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

FOR DOWNTOWN SERVICE
Three-wheeled "motor scooter," used experimentally by Michigan Bell to service downtown telephones, carries sufficient tools and equipment; does not tie up traffic. Story on p. 84.

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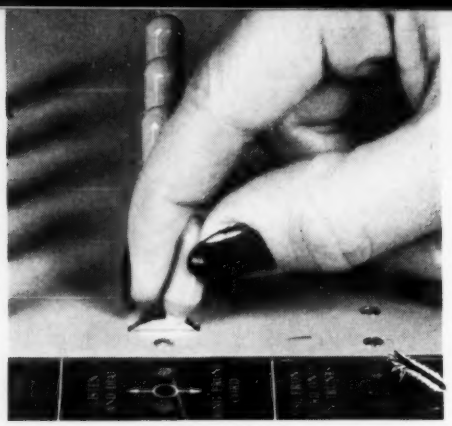

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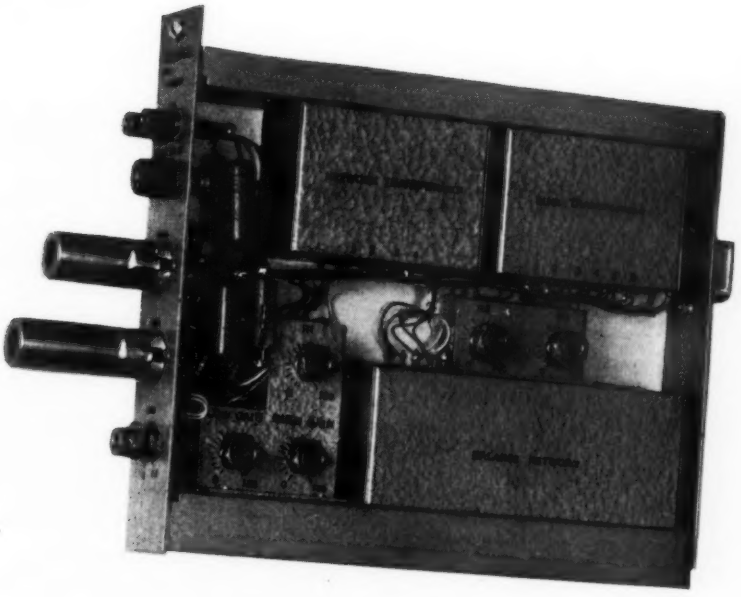

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FLASHES AND PLUGS

SWEET TALK. Consternation reigned in a Florida town recently, when Inter County Telephone & Telegraph Co. assigned a new exchange to it. "Clewiston is known as 'America's Sweetest Town'," wrote the aggrieved Chamber of Commerce president, and "now since the day Inter County suddenly assigned us the exchange 'Yukon,' we have been subjected to ridicule and embarrassment from our neighbors and visitors; and the sentiment of our own citizenry has been vitriolic."

The town feels that "sugar" would be a perfect exchange name, reported the town's spokesman, and further, who has earned a better right to it: Clewiston produces more raw sugar and molasses than any other town in the United States.

•

NUMERICAL NONENTITY. A local jobber had hired a new messenger. Instructing him on picking up certain items, the boss said, "And if they can't give you these things, be sure to telephone me. Just dial Capital 7-1234."

The boy stood thoughtfully, making no move to get started.

"What's wrong?" asked the boss.

"Oh, nothing's wrong. But I just don't know how to dial a capital 7."

•

HARRIED HIAWATHA. A Salt Lake City police sergeant is still wondering if someone was pulling his leg, or if he will get a call from a lady about an injured cat.

He received a telephone call recently from a lad who apparently believed that forestalling trouble is better than letting it catch up with you. He told the sergeant he had asked a neighbor lady if he could recover an arrow from her back yard. She in turn had asked if he knew where it landed.

"Is it illegal to shoot arrows in the city?" demanded the boy interrupting his narrative.

"Yes," said the sergeant.

"Maybe that's why she got mad when I told her it was in her cat," the boy said, and hung up.

•

BULL'S EYE. A short circuit and a gas leak combined in San Francisco recently to produce what looked uncannily like a case of tiddlywinks by remote control.

First a manhole cover was blown off a Pacific Gas & Electric installation with a boom heard 'round the district. The cover shot up, fell back, half in and half out.

Then a second explosion followed, which blew the cover up again, and down it came, right back in place, neatly covering the manhole.

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

April 27, 1957

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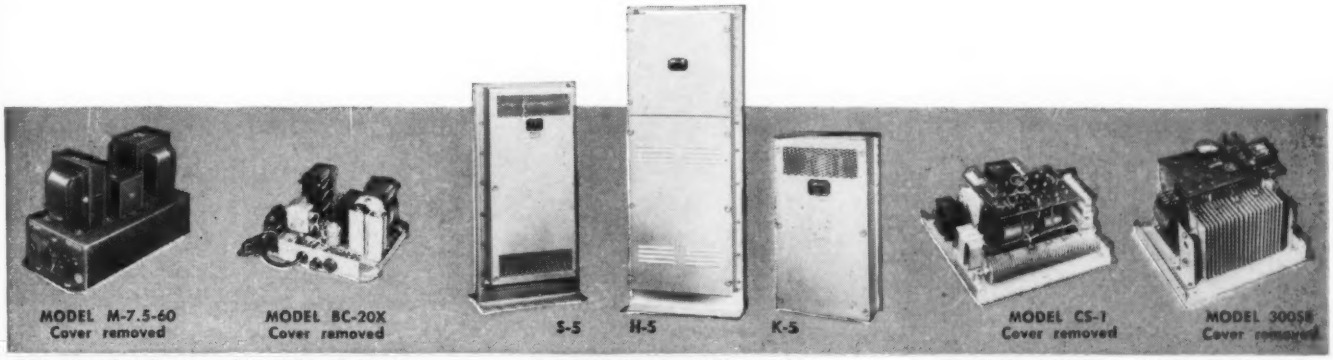

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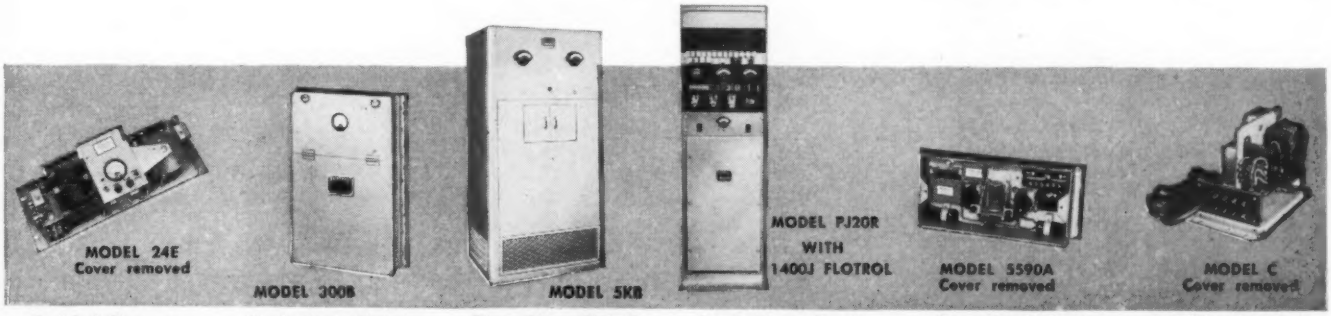

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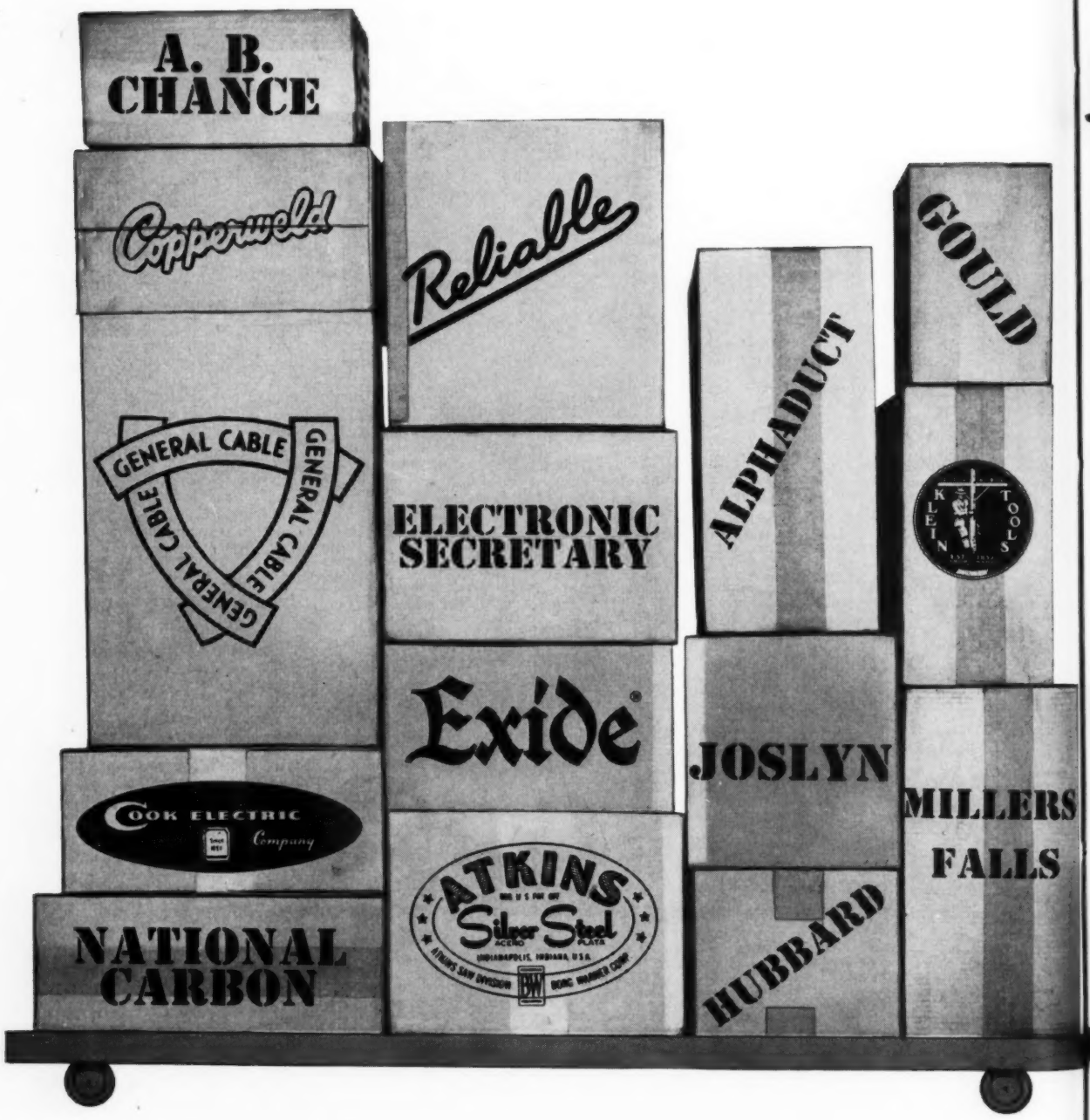

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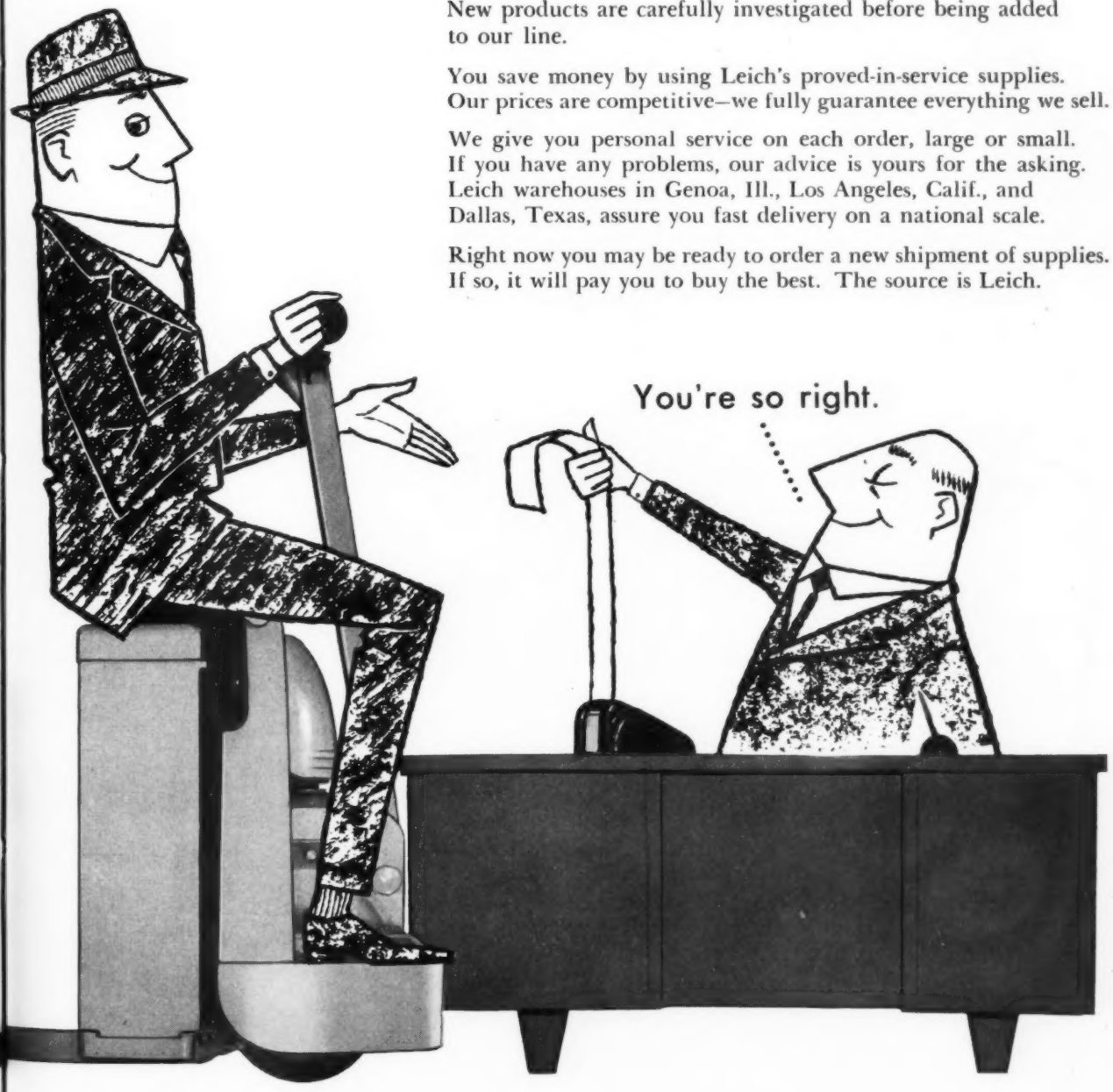

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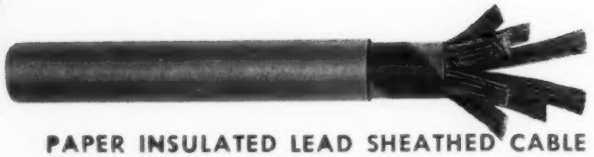

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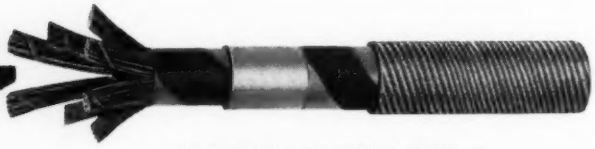

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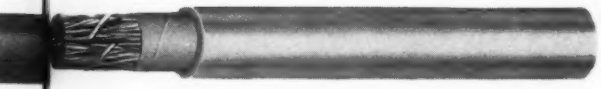

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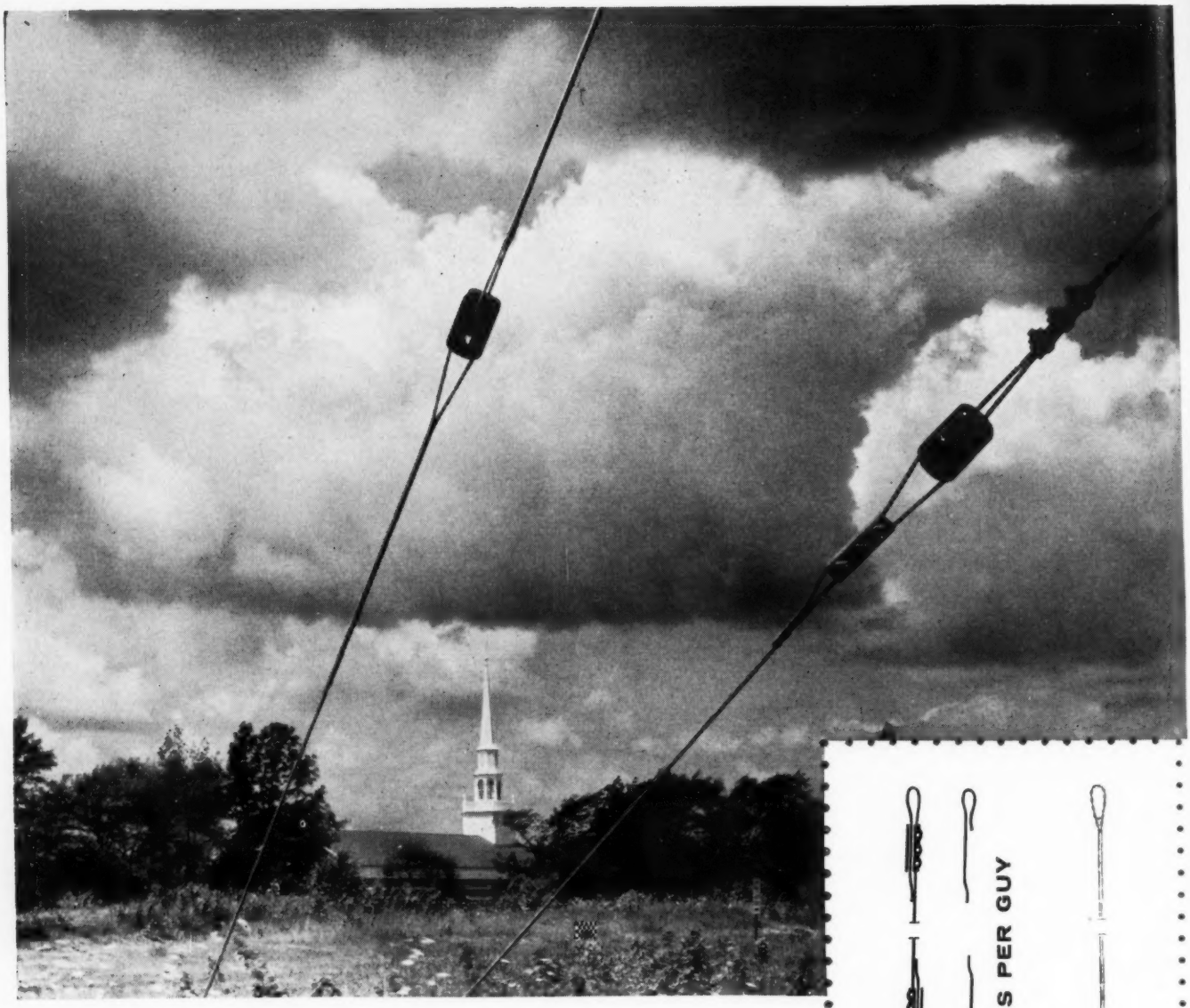

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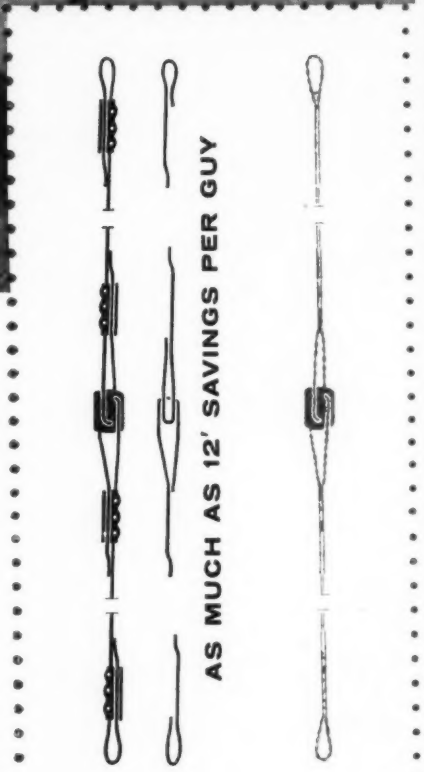

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The *Topographical* Plan of Rural Plant Design

By EARL SEEMAN and MILTON SEEMAN*

ON FEB. 8 of this year we watched a new rural line we installed in 1956 go down under a loading of ice, but without the usual alarm or discouragement that we have experienced numerous times before because these new lines were built to comply and cooperate with such sleet storms.

Ours is a typical small one-exchange Independent company (800 stations), perhaps with one exception; that being our geographical location as we are located in southwestern Minnesota on the state's highest elevation that constitutes a continental divide where the waters separate westward into the Missouri River and eastward into the Mississippi River. Sleet is a frequent visitor and high winds with variable velocity seem to be constant.

Consequently, our problem of maintaining dependable rural telephone service in our area against adverse climatic conditions have led us to pioneer a revolutionary and new concept in the design of rural open wire plant.

Our plan to "go dial" involved considerable replacement of rural plant that was beyond the point of rehabilitation due to age and repeated damages from ice loadings.

At the 1956 Minnesota telephone convention we viewed an exhibit of new materials to facilitate the topographical plan of rural plant design, a new theory that is designed to prevent the loss of aerial plant to the destructive forces of nature. This is revolutionary in the respect that the nature of the terrain establishes the general engineering procedures and allows aerial wire to yield to, and return to its original position from, ice loading by virtue of the wires' ability to stretch. This permits aerial plant to yield without breakage to wire and supporting structures, rather than defy these forces that destroy such plant.

After due consideration concerning this new method of building lines we invited C. Rosenvold of Suspension Insulators, Inc., of Minneapolis, who originated the plan and designed the materials to visit our exchange and assist us in the planning of our first few miles of line.

We were provided with a design chart applying to the wire used in this plan which is the only tool necessary, in addition to a measuring tape for determining pole locations.

By following the design chart, we feel that our new lines are within the maximum degree of accuracy in the objective of building plant that will yield to the elements of nature, which is considerably more accurate than we could ever hope to be in the design of plant to hold against the ice storms that we have experienced in the past. From this experience we know that man's best intent and calculated strength factors are unrelated to the severity and frequency of sleet storms.

The "Topo" (topographical) plan embodies a great deal of simplicity in the engineering and construction of such lines and, as the name suggests, the nature of the terrain not only determines the pole locations but also the economic aspect of the plan, as the natural sag in a long span of wire is most unlike level terrain as compared to irregular or hilly terrain. This illustrates that the efficiency of the plan

*Earl Seeman is owner and Milton Seeman is plant superintendent of the Jasper Telephone Co., Jasper, Minnesota.

EARL SEEMAN

MILTON SEEMAN

XUM

extends itself as a natural to the economic aspect of rural areas where low subscriber density is most common in hilly or untillable terrain. Being the first company to have crossarm and single circuit plant built on this plan, we are pleased to report two major advantages. The first is its costs are from 35 to 40 per cent below our conventional plant, and, secondly, we have seen it yield to and return from sleet loading without the usual breakage to wire and supporting structures and without interruption to the service involved.

We have several miles of this type of line in service and have noted a number of advantages and values of economy and of service that are too numerous to point out in this report. For example, the method of insulation and transposing in the "Topo" plan eliminates line noise or circuit hum which we have always assumed to be normal. The shortest possible span, with frequent pole supports, has been considered the best method to defy the destructive forces of nature that occur in less than 1 per cent of the life of aerial plant in the heaviest loading areas; however, the reverse is true when the objectives of aerial plant are altered to comply or cooperate with these same destructive forces.

It is mathematically correct that the longer the span, the less additional wire or elastic stretch factor is required to touch the ground in the center of the spans, and for wire to lie on the ground for several hundred feet in each span requires very little additional elasticity such as caused by ice loading conditions.

In the "Topo" plan, our crossarm plant, as well as our single circuit plant, is built on an average of seven poles per mile. This long-spanning permits the wire under the ice loading conditions to move to the ground to

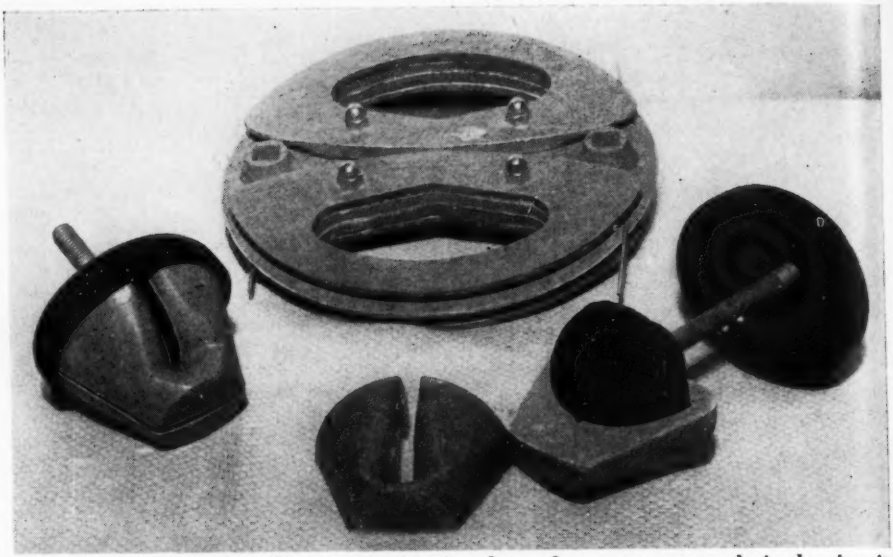


Fig. 1. (Foreground). The suspension insulator for crossarms and single circuit assemblies, shown assembled (left) and disassembled (right). (Top) The transposing plate.

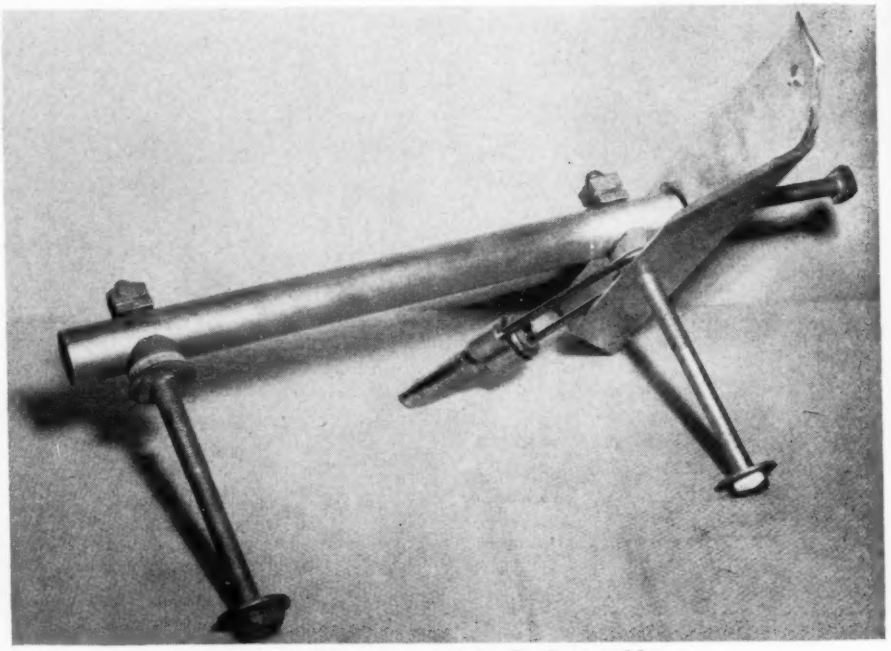


Fig. 2. The crossarm standard assembly.

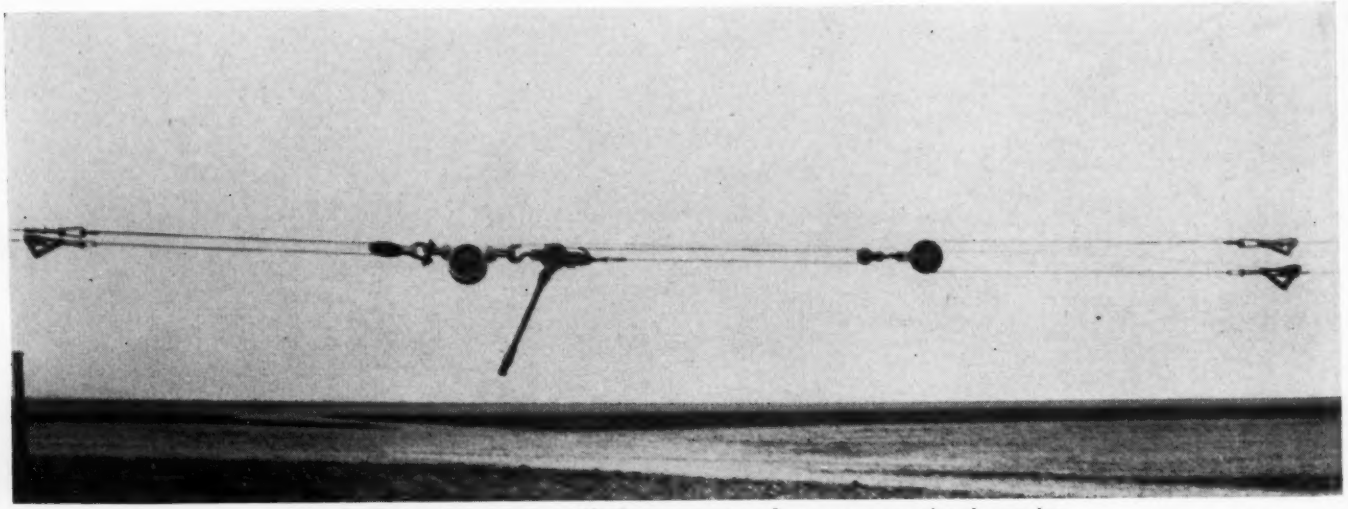
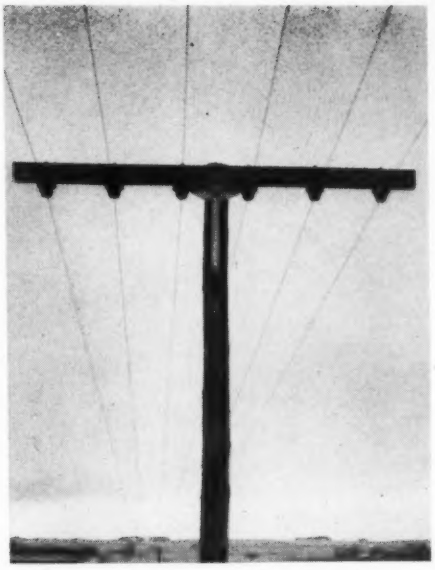
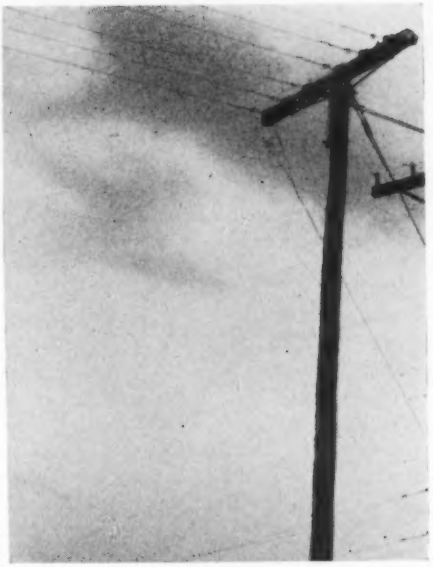


Fig. 3. The wire eveners with dynamometer that measures circuit tension.

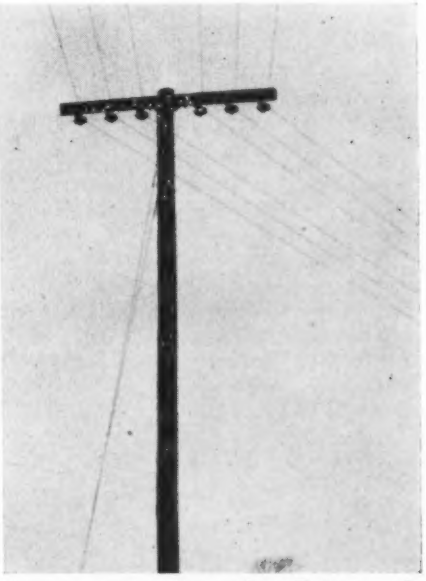
Line view of single circuit plant.



Three circuits on crossarm plant.



Six-wire dead-end on truss back-arm using the standard suspension insulator for dead-ending application.



Corner construction with sufficient angle to use the combination long nuts and the single circuit assembly insulators mounted on the sides.

rest its load in a planned manner. On short spans, ice loaded wire will exhaust its elasticity and endurance as to fatigue before any point of load relief is reached and the natural results are wire breaks and destruction of supporting pole and crossarm fixtures.

Under the "Topo" plan, the wire cannot exceed its safe working limits under ice loading conditions if the design is proper as to span lengths. Conservative span lengths under this plan reduce the safety factor, as it divides the wire's elasticity into a greater number of spans, thereby reducing the possibility of complete recovery to its normal and unloaded position.

Obviously, we have used and considered only the highest tensile strength wire in their respective transmission fields in order to gain maximum elasticity, as well as strength, to insure workability of the plan. These conductors contain excellent values of strength and elasticity that will respond to ice loading by lying on the ground for considerable distance in each span before an ice load of one-half inch in radial thickness is reached.

As plant men in a heavy sleet loading area, we have desired a weak point to act as a fuse or a valve to prevent the chain reaction of aerial plant destruction when attacked by the destructive forces of nature. We feel that we have such a release point in our new rural lines, but rather than be found in areas of weakness it is found in the strength and modulus characteristics of the present-day high tensile wire.

The key to designing plant on the "Topo" plan is as follows: *Maximum parallel between wire and terrain at minimum required ground clearance within the longest possible span.* No span is too long unless minimum ground clearance requirements have been violated, or increased wire tensions beyond that recommended are used to prevent such violations. Like conventional plant, subscriber locations, wire junctions, corners, road and driveway crossings are pre-determined pole locations under the "Topo" plan and limits the area betwen these fixed points for topographical planning. As spanning over the longest possible distance is essential from every pole location, extra-length poles are used. This corrects the tendency to set too short a pole at these pre-determined pole locations, thereby providing adequate clearance over roadways and for subscriber drops.

It is essential in the "Topo" plan to eliminate the principle of independent span fixtures in order to allow free movement of the wire from one span to the other, as in the case of falling trees or limbs, or where adjacent spans are unlike in length and under ice loading conditions, will borrow slack and elasticity from one to the other. This is accomplished by the removal of the bond (tie) between the horizontal wire and the vertical pole factors of aerial plant. There is no provision or necessity of ties to insure insulation, as the new suspension type of insulator mounts under the crossarm and there exists no back and forth motion of the wire due to wide variation in elevation of the wire from pole tops to mid span.

This change in principle, from bonding of the horizontal wire to the vertical pole supports by means of ties on conventional plant to the free suspension of the wire through the under the arm type of insulators, constitute the major change in the "Topo" plan. To properly implement this new type of rural plant, four new materials are required to extend the values of the wire that makes this plan possible. These are as follows:

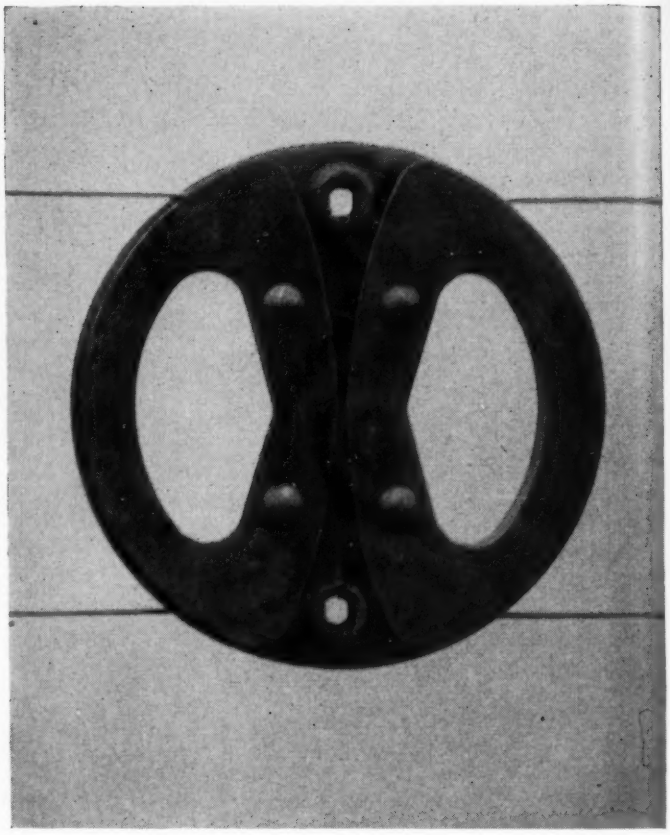
The suspension insulator consists of four parts (See *Fig. 1).* The weatherhood that provides the dry path is of heavy-wall polyethylene that also serves as a lock ring for the two wire hangers that treat each span and its variable vibrations separately. These two hangers in each insulator transfer the wire vibration to the supporting neoprene rubber core on which they are supported. This neoprene core is molded onto the bolts that are of appropriate length for crossarms and for the single circuit assemblies. This in-

sulator is also used for dead-ending of open wire as well.

The combination long nut is of a high strength insulating material that reverses to three applications of use on single circuit lines, such as straight line, vertical and horizontal dead-ends.

The transposing plate is designed to transpose the circuit in mid-span in the "Topo" plan and is also to be used on the crossarm on existing and conventional type of open wire lines (see *Fig. 1*). It is 10½ inches in diameter and 1¼ inches in thickness. It is identical on both sides and consists of a center base plate with four wing plates that are attached to the center section by means of four bolts equipped with crown nuts for easy wrenching application. The transposing plate is turned into the circuit with one wire on top and the other on the bottom side. Large hand holes are provided for easy turning against tensions of the wire. This plate provides 8 inches of spacing of the wires in the circuit and requires no changes from left to right over transpositions. When used in the "Topo" plan where there are no ties at the suspension insulators, the four bolts are loosened to permit access of the wire into the locking groove of the plate, then the bolts are tightened to lock both wires securely in the plate, which prevents a broken wire from running beyond the plate locations. Raised bosses with elongated bolt holes are provided in the sides of the plate for bolting onto crossarms when used on conventional wire plant.

On our two-wire lines, we have used the transposing plate near the center of each span. This provides stability to the circuit in high-cross winds as its weight of 4 pounds serves as a ballast to effectively reduce vibration at its point of origin in the center of the span. On multi-circuit lines, we have used the standard R-1 transposition scheme with the transposing plates in the center of the span. The weight of the plate causes the transposed circuit to sag slightly below the adjacent straight through circuit and prevents the possibility of mid-span wire contact. We have even tried, by manual methods, to cause such mid-span contact, without success.



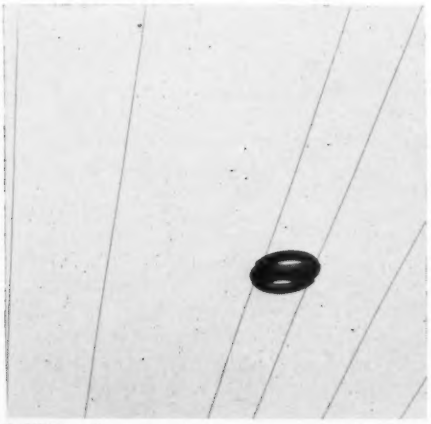
Transposition plate. The open wire circuit is locked under the raised wings of the plate which prevents the wire from running in the event of an open.

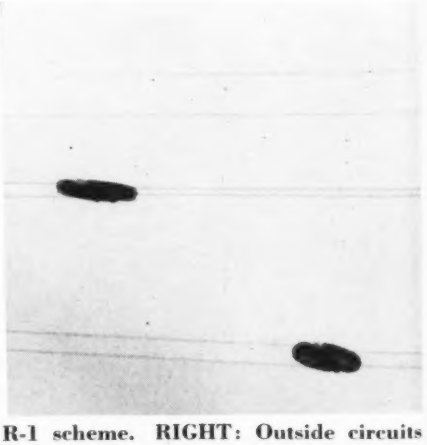
Crossarms are attached to the pole by means of two through bolts 14 inches apart and supported at right angle to the pole by a 3-inch angle iron that supports the underside of the arm for a distance of 18 inches (see *Fig. 2*). This angle section is, in turn, supported by a 1½ inch pipe section that is also 18 inches in length and is bolted to the hole with the two through bolts.

This assembly is designed to leave the entire under-arm area free for the suspension insulators, as well as to extend substantial strength to the crossarm. It also has provisions for a fuse action in the event of sudden unbalanced loads that normally would break the crossarm or the pole by bending of the pipe section between

(Please turn to page 74)

Line view of typical three-circuit plant with transposition plates.





LEFT: Center circuit transposed on the R-1 scheme. RIGHT: Outside circuits transposed on the R-1 scheme showing how the weight of the transposition plates prevents mid-span contact between circuits.

TELEPHONY'S ELECTRONICS SECTION

BY HAROLD B. McKAY, ELECTRONICS EDITOR

ELECTRONICS IN THE SMALL COMPANY

IT WOULD be natural to assume that the large telephone companies would be the first to install electronic equipment in their plant. However, the smaller companies may have more to gain. Electronics is moving in on the telephone field because apparatus of this sort is able to do a job better and cheaper than other systems.

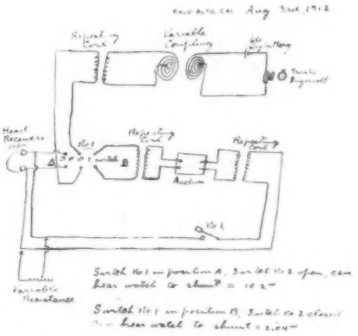
Probably one of the biggest features of electronic equipment will be ease of maintenance. Without moving parts to adjust, with no contacts to clean, and with plug-in components that can be changed in an instant, electronic systems will have an appeal to any company that cannot afford a large crew of trained specialists.

However, those who do operate electronic plants will need certain fundamental knowledge in order to analyze trouble and make intelligent decisions. Fortunately, the principles involved are the same as the fundamentals of radio, and there are many sources of knowledge on the subject. Various books and correspondence schools in the field offer opportunities for the owners and employes of small companies to gain the knowledge which will soon be required to operate their plants.

This section of TELEPHONY brings news of the new ideas as obtained from the patent office and new products actually being manufactured in the electronics field. The small exchange will be the first to use many of these ideas, because it is simpler to build a small exchange brand new from the ground up than it is to change the system in a large city. At the USITA convention last October two electronic exchanges were demonstrated; both were small in size. Next year the first working office of this type is scheduled to be installed in a small Bell exchange in Illinois.

ELECTRONICS ANNIVERSARIES

INDUSTRY this year has taken note of some important anniversaries in the electronic field which emphasize the accelerated pace at which our scientific civilization moves. Earlier this year the 50th anniversary of the vacuum tube's invention by Dr. Lee De Forest was duly noted in the scientific journals.



This is an original illustration from a Federal Laboratory notebook. It presumably was used to show the amplifying properties of the "Audion" vacuum tube. From the IRE Grid.

The IRE's *Grid* published a drawing from a Federal Laboratory notebook which, made in 1912, was probably the first workable electronic diagram ever made.

This year also marks the 30th anniversary of television. On April 7, 1927 a Bell Laboratories demonstration permitted Herbert Hoover, then Secretary of Commerce to talk with Walter Gifford of AT&T over a circuit which also transmitted Mr. Hoover's image in recognizable form.

Early TV experiments included viewing devices made from neon lamps and whirling disks. Some of these provided a picture area of but one square inch. Some transmitted plain black and white, so that only silhouette images could be telecast.

NEW TRANSISTOR IDEAS

LAST month this department mentioned two new transistor ideas. One was a scheme for using the radiated power of several radio stations to supply power to a transistor receiver so that you could receive one station without using batteries. The other idea was the use of transistors to provide party line identification for toll call billing.

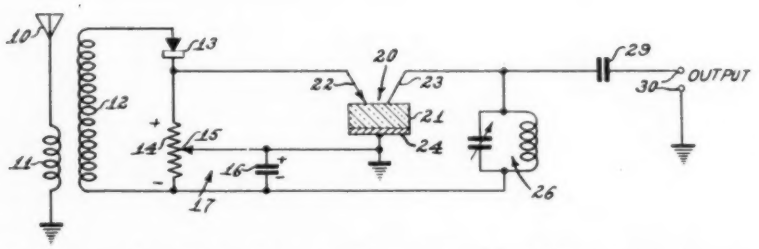
Typical circuits for these two ideas have been received from the patent office and are shown here. The first, the *free power radio* consists of a broadly tuned antenna 10, and coil system 11 and 12. The power from the air as brought in by the antenna is rectified by crystal 13 and charges condenser 16.

This condenser then becomes the power supply for the transistor 20, which by virtue of tuned circuit 26, picks out and amplifies the signal of one particular radio station. The potentiometer 14 determines how much of the received energy will be stored and how much will be amplified.

This patent No. 2,777,057, issued to J. I. Pankove and assigned to RCA, also includes methods for using several transistors for increased power.

Line identification by means of transistors is illustrated in patent No. 2,782,259 issued to Thomas Dimond and assigned to Bell Telephone Laboratories. This idea uses a cold cathode gaseous discharge tube 112 to isolate the identification circuit from the telephone line except when actually being used. In practice, several stations might be connected to the same line. Each would have a differently tuned oscillator. The central office end would have a corresponding number of detector circuits like 15 and 16, each of which would be tuned to a frequency generated by a station on the line.

When party identification is required, the relay 12 would operate, applying the voltage of battery 14



Free-powered radio is shown in Patent No. 2,777,057. Part of power received by antenna is stored in condenser 16, which in turn furnishes power to transistor 20.

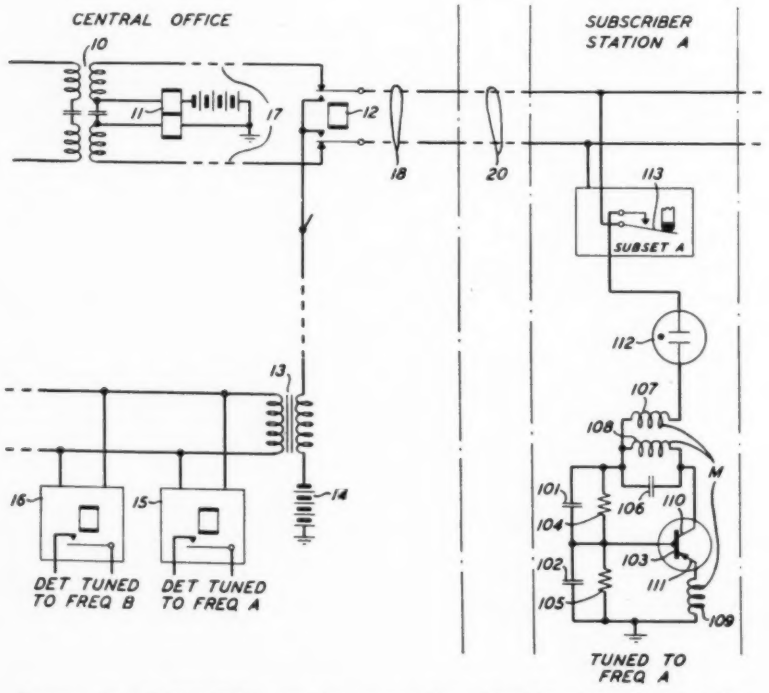
to the line. This voltage would be high enough to trigger the gas tube 112 through the hookswitch 113. This would permit this battery voltage to enter the transistor (103) circuit. Because of the mutual coupling (M) between the coils, oscillations would be developed, which would go back through the tube and through transformer 13.

Depending on the frequency, the relay in one of the detectors (15, 16, etc.) would be operated, which in turn would perform the necessary registration or billing operation.

A transistorized pill is another new application of these versatile crystals. A small FM transmitter has been built into a capsule. It can be swallowed and then will broadcast certain information about your innards while the doctor tunes you in on a nearby radio set.

Developed by RCA the radio pill operates on a frequency near one megacycle.

If you happen to catch a transistorized fish, don't be surprised. Experiments have been conducted in which small pulsed transistor oscillators have been attached to salmon so that they can be tracked by ultrasonic detectors.



Patent No. 2,782,259 permits party line identification by transistor oscillator 103 and tuned detectors 15 and 16.

MAGNETIC STEPPING

MAGNETIC STEPPING has not become obsolete with all of the trend to electronics. Rather, it seems that electronics will combine with magnetic systems to make the latter more efficient. Many magnetic stepping devices, such as those used in telephone switches use the electromagnet to cock a spring, which on its release actuates the mechanism.

A recently issued patent, No. 2,780,754, covers a means for using two electromagnets on a switch. One magnet cocks the mechanism, while the other assists on the operating stroke. The objective is to provide a faster and more positive action.

To increase the speed, the driving magnet is electronically actuated by means of a trigger pulse, capacitor storage circuit and a thyratron tube. The electronic circuit converts the trigger pulse to the two pulses necessary to cock the mechanism and to drive it. The storage circuit provides the heavy current surge needed for fast response.

The patent was issued to Ernest Lovell and assigned to the Burroughs Corp.

HANDS-FREE TELEPHONES

OVER 75,000 hands-free telephones are now in use, and 90 per cent of the users are satisfied with them, according to papers presented at the January, 1957 meeting of the American Institute of Electrical Engineers. However, from an engineer's viewpoint there are some drawbacks to the present methods used.

A certain degradation of transmission results because of the fact that a 20db loss is introduced into the transmission path compared to that of a handset held to the head. This loss through the air must be made up by amplification. The acoustical surroundings of the instrument sometimes are such that the rever-

beration or the sum of all of the echo paths may be such that the echoes transmitted are greater than the direct speech.

This results in the far-end user hearing room noise and echoes. In addition, the far-end user may hear a certain amount of echo of his own voice coming back to him after it jumps from the loudspeaker back into the transmitter.

The amplification must be limited by the fact that the loudspeaker and microphone can create a negative impedance condition in which feedback and singing can occur.

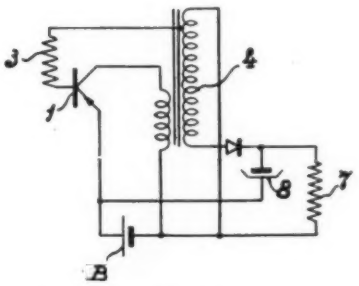
Ideal conditions for hands-free telephony would include a booth or acoustically treated room which would not have hard walls or table tops or similarly reflective surfaces. A neck, head or lapel microphone would be useful also. However, it is doubtful if the customer would wish to accept these conditions in order to spare the far-end user the experience of talking into a telephone that sounds like an empty barrel. Papers on this subject were presented to AIEE by J. W. Emling and A. F. Rose of the Bell System and V. Rodek of Stromberg-Carlson Co.

POWER SUPPLY

MOST electronic equipment poses a problem of power supply. This applies to everything from the portable radio to the subscriber line carrier. One reason for this is that many electronic circuits require one relatively high voltage source—the "B" battery or its equivalent. When ac is available, the problem is easy: a transformer steps the voltage up as needed.

In direct current operated devices, either more batteries or a motor generator set has been used in the past. Telephone offices, for instance, may use both of these in order to supply plate voltage for carrier and repeaters.

Even the transistor may require elevated voltages in some applications. However, a recently issued patent No. 2,780,767, provides a means for getting these higher voltages from low voltage sources by



Patent No. 2,780,767 uses a low voltage battery B to develop oscillations in transistor 1, which are stepped up in voltage by transformer 4 and delivered to load 7 by a rectifier. AC is filtered out of load by condenser 8.

using a transistor connected as an oscillator. This produces an alternating current from the low dc voltage. This ac is then stepped up by a transformer and rectified by a crystal or equivalent and applied to the load as a higher voltage. The patent is issued to P. J. H. Janssen and assigned to the Hartford National Bank and Trust Co.

LINE CONCENTRATOR

One of the characteristics of telephone traffic is that only a small percentage of the total customers require service at any one time. All central office switching equipment is designed with this fact in mind. This fact is also taken advantage of in the use of the community dial office (CDO), whereby small communities are equipped with small unit-built central offices with only a few trunks to the nearest large city.

A further development in this direction is the use of a line concentrator. This is something less than a CDO. It is not a complete central office in itself, but possesses many of the features of the small exchange. Basic principle of operation is the provision of a few trunks from the office to a switching point, to serve a larger number of subscribers.

For example, 100 customers in an outlying territory may be served by only 10 trunk lines. A switching arrangement near the customers' location would connect the telephone to a trunk to the office whenever needed.

In a sense, the party line has been an attempt to do the same thing—work many lines on fewer pairs.

There have been several approaches to the line concentrator idea. At last winter's general meeting of the AIEE in New York, H. G. Evers and J. T. Wylie of Leich Electric Co. presented a paper describing such a system. Using a concentrator developed by Christoph Gfeller AG of Bern, Switzerland, experiments were conducted with affiliates of the General Telephone System.

The concentrator used low-power cross-bar switches of a design which permits locking up the connection by gravity and spring tension rather than by magnetic power. Thus, power is used only to establish the connection, not to hold it. What power is needed is supplied from the central office, thus no separate power installation is needed at the concentrator location.

Connections established by the concentrator are direct, with no repeat coils, impulse relays or potentials introduced at the concentrator location. Calls between two stations fed by the concentrator, unlike a CDO, would require two trunks into the central office because all dial switching is done at that point.

In addition to the trunks between the concentrator or office, two control pairs are used to perform certain switching functions.

It is expected that the line concentrator may prove in for permanent installations at some points, while at others it may act as a stop-gap until additional lines can be built into an area.

NEW THINGS

AMONG the latest things announced by manufacturers is the Surgistor. Made by the Wuerth Tube Saver Corp. of Detroit, this device is composed of elements that combine the functions of a resistor and a relay. Purpose is to reduce the inrushing surge of current to electronic devices when they are first turned on.

A new sweep generator for use

with microwave systems has been announced by Polarad Electronics Corp., 43-20 34th St., Long Island 1, N. Y. The new oscillator covers 1,000 to 15,000 megacycles.

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COMPANIES owning radio transmitters must make periodic frequency checks. This is usually done with a frequency standard of some sort, but this standard in turn must be checked against a primary standard. This is usually done by tuning a radio set to the National Bureau of Standards station WWV or WWVH which broadcasts standard frequencies.

A receiver, specially made to tune in to each of the WWV standard frequencies is now made by the Shasta Division of Beckman Instruments Co., P.O. Box 296, Station A, Richmond, Cal. The set can be rack mounted and tunes to all six WWV frequencies by a front panel selector switch.

•

A FREQUENCY METER which will cover 20 different channels from 25 mc to 470 mc is now made by the Allen B. Dumont Laboratories of Clifton, N. J. Instruments like this are required to service mobile radio installations. The new meter, identified as Type 5890-A uses 20 crystals in its control circuits, and does a job which formerly required several instruments.

•

A NEW sensitive RF Voltmeter has been announced by Boonton Electronics Corp. of Montclair, N. J. Designated model 91B the new instrument is accurate from 0.2 mc to 500 mc and is useful to 1000 mc. Two probes are supplied with the meter, one for high impedance and one for coaxial systems.

•

A PORTABLE radio-telephone called the TR 246 Packset has been developed by Kaar Engineering Co., P. O. Box 1320, Palto Alto, Cal. Built for industrial and utility use, the Packset operates with amplitude modulation in the 2 to 8 mc frequency range from self-contained batteries.

•

A RAPID method of getting news pictures on the air via TV was recently demonstrated. The picture was taken at the scene of the action on a Land Polaroid camera, which turns out the finished picture in a minute. The picture was then placed in a slow-scan TV unit and sent over a telephone line to the television station. At the station, another Land camera snapped the picture as it was reproduced on the slow-scan unit. The finished picture from this camera was held in front of the regular TV camera and broadcast to the public within minutes after the original was taken.

•

FREQUENCY stability without the use of quartz crystals is said to be possible by means of tuning units composed of silver ribbon molded in Supramica 555 ceramoplastic. This plastic, used in a newly developed oscillator for the Signal Corps, is made of electrical glass and synthetic mica. It permits molding with great precision.

•

A GAMBLING robot which matches pennies with human opponents is in operation at Bell Telephone Laboratories. It has won 5,218 times and lost 4,577 times. The odds against obtaining this kind of a lead by just plain luck is something like 10 billion to 1. The machine was designed as a step towards an ultimate objective of a machine that will adapt itself to a changing environment, such as handling varying numbers of telephone calls.

•

ULTRASONIC vibrations have been used for some time in industry for the cleaning of small parts. Cleaning solutions which are agitated by electronically generated sound waves develop a highly effective scouring action. Now, the principle has been applied to removing barnacles from ships hulls. A transducer consisting of nickel plates is fastened to the hull. When the current is turned on the plates vibrate, and the barnacles leave for more peaceful waters.

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THE PRINTED circuit board which is now being used in several electronic fields, including telephony, has not yet begun to make its full impact. Industry people predict a 10-fold increase in the use of this technique, particularly in the telephone field.

•

PEOPLE who like to leave their telephone receiver off the hook will be baffled by a new AT&T patent which provides for a relay located out on the line. The relay can be operated from the central office, to cut off the party who has the receiver off, without affecting the other stations.

•

A NEW printed circuit pliers featuring compound leverage for easier cutting and one operation cutting and crimping is being manufactured by the Utica Drop Forge & Tool Corp., Utica 4, N. Y.

Formerly a custom tool, the No. 470-5 printed circuit pliers has been added to Utica's standard line.

Especially useful in the electronic industry, this tool crimps as it cuts to prevent the cut wire from sliding back through the hole of the printed circuit board.

The manufacturer has added compound leverage action to this tool to give smooth easy cutting action and reduce operator fatigue.

THINGS TO READ

THE Lenkurt *Demodulator*, a handy little publication devoted to the presentation of facts about carrier, recently completed its fifth year of publication. Circulation is now five times what it was when the paper started. You can get on the mailing list for this publication by writing to Milt Seymour, editor,

Lenkurt Electric Co., San Carlos, Cal.

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THE March issue of the Stromberg-Carlson *Carrier*, contains an interesting article on the "Application of Negative Impedance to Telephone Transmission Lines." This article contains some important facts on transmission and is complete with several diagrams and formulas. Write to George Forbes, editor, Stromberg-Carlson Co., Rochester 3, N. Y., to get on the mailing list for *The Carrier*.

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A NEW scientific magazine is now being published by International Business Machines Co. Called the *IBM Journal of Research and Development*, it is issued quarterly and is dedicated to publishing the latest developments in the field of computers, data processing and design of components. Price is $3.50 per year from IBM, 590 Madison Ave., New York 22, N. Y.

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A TUBE handbook covering the complete line of LM Ericsson's miniature tubes is available by request on company letterhead from State Labs, Inc., 649 Broadway, New York 12, N. Y.

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USEFUL tables and charts on the design of iron core chokes is contained in the March, 1957 issue of The General Radio *Experimenter*. You can get on the mailing list for this publication by writing to General Radio Co., Cambridge 39, Mass.

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HOW TO GET LICENSED

Technicians

for 2 way radio

...microwave

ALL TYPES OF ELECTRONIC EQUIPMENT

The basic requirement of an electronic technician is a thorough understanding of the fundamentals. The electronic devices being used by telephone companies demand technicians who "think electronics"!

This publication *Telephony* recently inaugurated a section devoted to electronics. This is graphic proof of the impact made by electronics on the telephone industry.

There is no need to hire new personnel . . . no need to lose valuable man hours by sending your employees to school. We will provide effective training for your present staff . . . at a moderate cost . . . and we guarantee the results.

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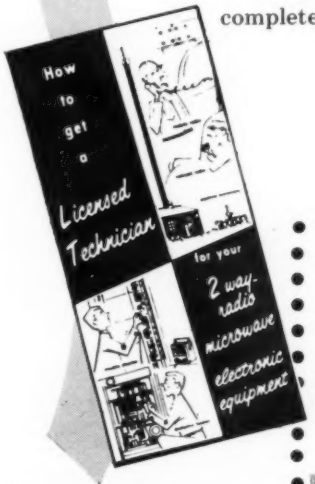

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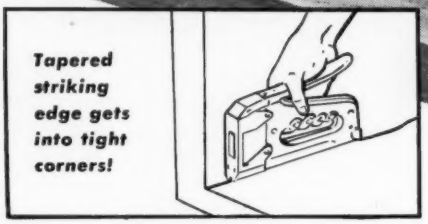

- T-25 staple gun holds ⅜", 7/16", and 9/16" round crown, rust resistant staples, a full ¼" in width.
- Safe! No short circuits possible automatic mechanism stops staple at right height.
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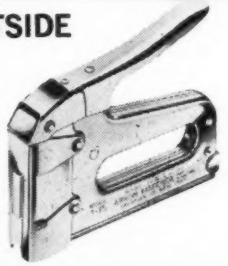

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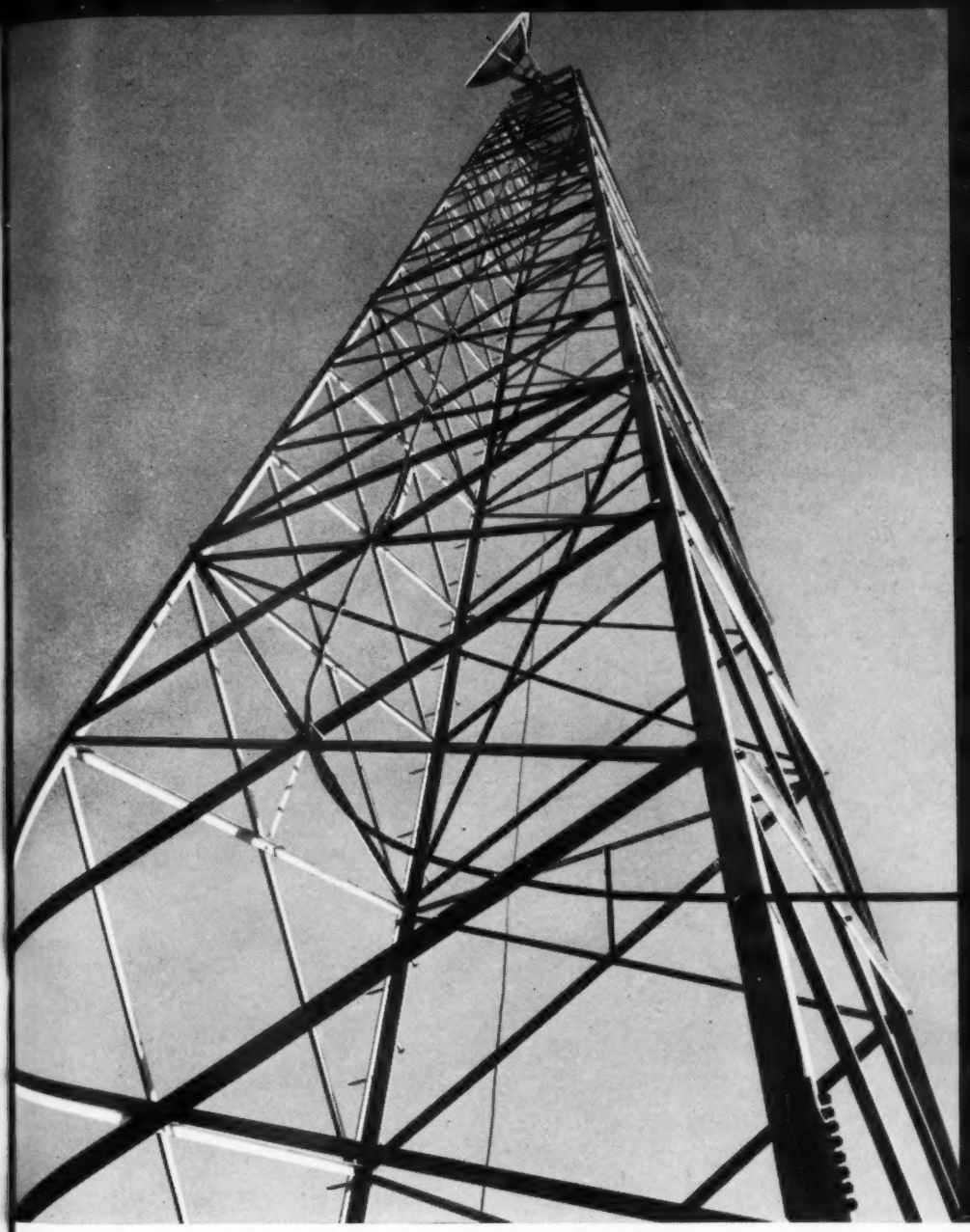
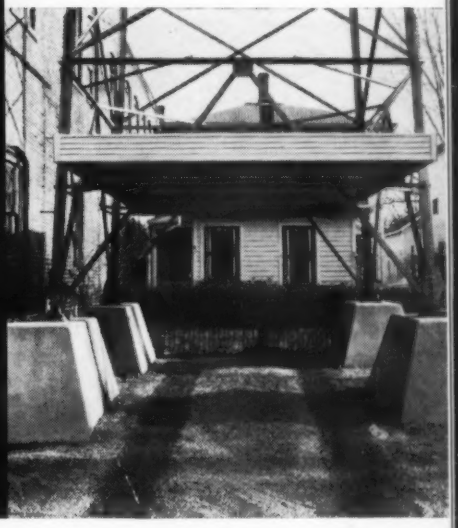


Close-up of Blaw-Knox self-supporting tower at Willard, Ohio, showing parabolic reflector aimed for second tower 15 miles distant at Norwalk, Ohio. Design of both towers will permit installation of additional parabolas as company expands its Microwave facilities. A problem of sandy sub-soil at this location was solved by extra large size footers set twelve feet below grade.

World's most unusual car port?

Premium parking space adjacent to the company's Norwalk, Ohio, office was not only preserved but improved by custom designing this tower base slightly higher than usual. A flat-top auto shelter was then inserted, using the tower legs as roof supports. In similar cases of minimum ground availability, Blaw-Knox Towers have been erected on top of buildings or astride small equipment shelters.



To Northern Ohio, Microwave means...

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That's what Colonel William C. Henry, President and General Manager of Northern Ohio Telephone Company, Bellevue, Ohio, has to say about the Microwave installation they placed in service July 31, 1956. In addition, 18 thousand of the company's more than 98 thousand customers are now getting better toll service. Once again, Blaw-Knox Towers play the important supporting role in bringing all these benefits to both company and customers.

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INDEPENDENT

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Nine states have laws to permit use of federal funds for reimbursement to utilities for relocation of facilities due to federal-aid highways. Eisenhower Administration's policy of encouraging private enterprise to develop power projects still stands. American Stock Exchange president urges investment bankers to help small businesses raise equity capital.

AS OF THIS writing (Apr. 19), there are nine new laws on the statute books of the various states which will permit the use of federal funds, in some form or another, for the reimbursement of public utilities obliged to relocate their facilities due to construction of federal-aid highways. These laws were the outgrowth of the federal statute passed last year by Congress which permitted public utilities to obtain such reimbursement only where allowable by state law and in accordance with such state law. The nine new laws were passed in the following states: Georgia, Idaho, Massachusetts (1956), Montana, New Mexico, North Dakota, Oklahoma, Tennessee, and Utah.

The new law in Georgia does not do the telephone companies or other business-managed utilities in that state any good, so far, because its benefits are confined to government-owned utilities. But it is hard to imagine that Georgia will permit such a discriminatory state of affairs to persist. A bill to extend the benefits to all utilities is now before the legislature.

Two other bills were passed but vetoed in Kansas and Wyoming, respectively. The governors of Colorado and New York had two other bills on their respective desks, at this writing, awaiting their signatures or vetoes. (The Colorado bill was earlier reported as signed in this department, by error.)

Looking around the rest of the states, we find that relocation bills in various forms have passed in one chamber, or otherwise still pending with some chance of final action this year, in the following states: Delaware, Florida (session started late), Iowa, Maine, Missouri, Ohio, Pennsylvania, Rhode Island, Texas, and Vermont.

As already indicated, the terms of these individual state laws vary considerably. They range from a limitation of benefits as to amount to a limitation of benefits as to type of road construction.

Later on, when the state legislative sessions have been completed and a final roundup is more practical, your correspondent will endeavor to summarize the provisions of these individual statutes.

It also must be kept in mind that new legislation is not necessary (because of existing practice permitting reimbursement of utilities for relocation expenses) in such states as California and New Jersey.

Doom of the Toll Roads

One development of collateral interest to all citizens and one which is likely to be of special interest to public utility companies, because of the future relocation factors involved, is the fight being waged in some quarters on toll roads.

This may surprise a good many people who were under the impression that all of these new superexpress highways, for which tolls are being collected, were financially successful and that the future trend might be in the direction of more toll highways.

It may still turn out that way. But the advent of President Eisenhower's federal-aid highway construction program has put a damper on planning for new toll roads.

The simple reason is that these federal funds will not be made available to any state for road construction where tolls are charged. A toll highway is supposed to pay for itself. Revenue bonds are issued to finance construction with the expectation that they will be paid for and redeemed out of earnings.

Another complication about toll roads is the fact that not all of them are turning out to be as successful as the earlier ones, such as the Merritt Parkway, which connects New York traffic with New England, and the New Jersey Turnpike, which connects New York traffic with Philadelphia and the South. And even one which is the most popular and financially successful—the Pennsylvania Turnpike — is under political attack by the governor of that state, George M. Leader.

Senator Gore (D., Tenn.), chairman of the Senate Public Roads Sub-committee, predicts that "the toll roads will go the way of the turnpikes of many years ago." But it is not so easy. Once bonds are issued they become the obligation of the state.

That is the situation in Pennsylvania, where Governor Leader would have to find some way for the state to take over the obligation of outstanding bonds in order to abolish the tolls and qualify for federal aid.

Of course, no existing highway — whether toll or free— now qualifies for federal aid, if it was built before 1956. But, a movement is under way in Congress to see if Uncle Sam cannot be persuaded to make the federal-aid program retroactive for roads built since 1947.

The argument for this is to the effect that the present federal-aid law penalizes those progressive states which had the gumption to go out and build new improved highways bofore the federal government got interested in the program. Those states which sat back and waited for Uncle Sam's assistance will get all the gravy.

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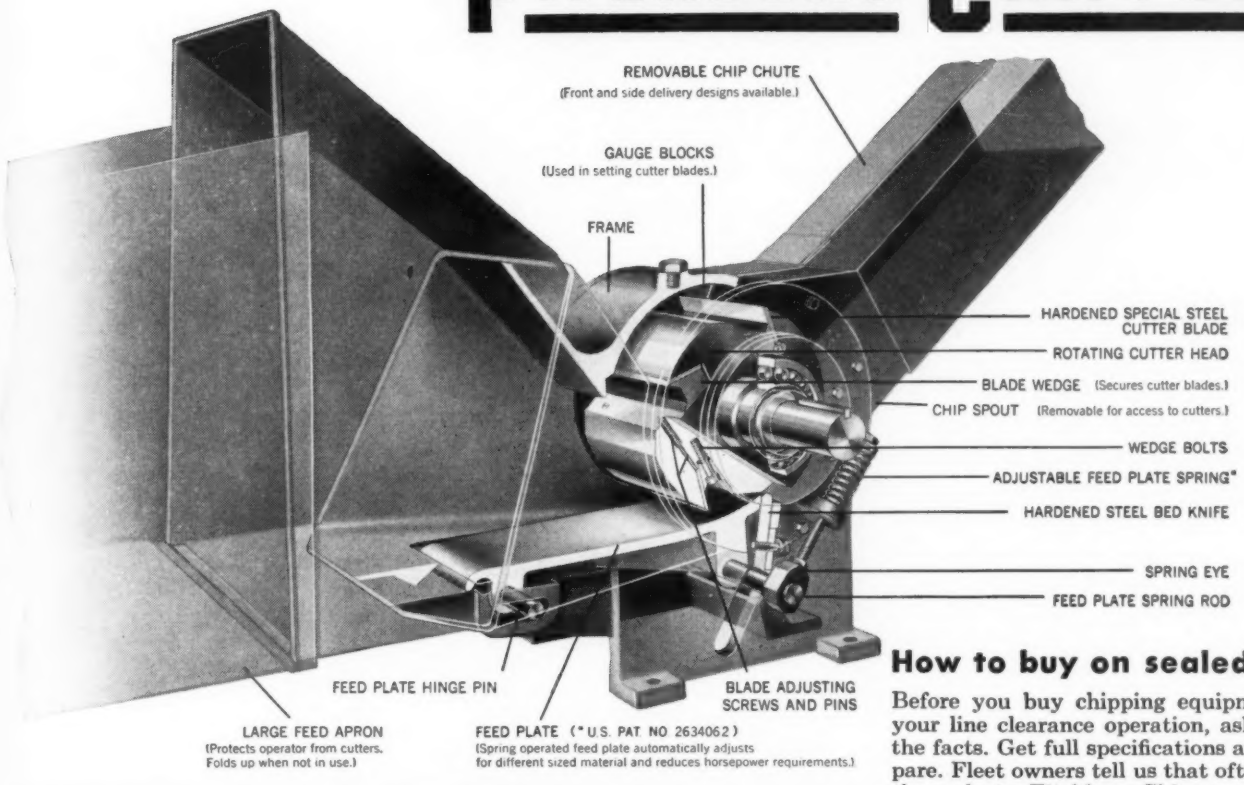
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CHIPPING UNIT — MODEL (Trailer Type)	TWC-6	TWC-612	TWC-9	TWC-915
Diameter of cutter head	9½"	9½"	11½"	11½"
Length of cutter head body	6"	12"	9"	15"
Number and length of cutter blades	4—6⅜"	4—12⅜"	4—9"	4—15"
Type of blade	Special High-Chrome, High-Carbon Tempered Steel			
Cutter head shaft size, (diameter)	1¾"	1¾"	2½"	2½"
Shaft keyway size	⅜" x 3/16"	⅜" x 3/16"	⅜" x 5/16"	⅜" x 5/16"
Approximate weight of chipper only	415#	650#	630#	1,000#
Maximum knife setting	¼"	¼"	⅜"	⅜"
Capacity—maximum size round (limbs, etc.)	4½"	4½"	7"	7"
maximum size width (slabs, etc.)	6"	12"	8½"	14½"
All units equipped with exclusive *Fitchburg Safety Spring*-activated feed plates (U.S. Patent No. 2634062)				
POWER UNIT — Gasoline fuel.				
Number of cylinders	4	6	6	6
Cu. In. Piston Displacement	162	226	226	251, 330, or 427
Water Cooled	Yes	Yes	Yes	Yes
Electric starter and generator	Yes	Yes	Yes	Yes
Clutch Power Take-Off	Disc Clutch	Disc Clutch	Disc Clutch	Disc Clutch
Battery	6-volt	6-volt	6-volt	6-volt
Governor	Var. speed	Var. speed	Var. speed	Var. speed
Oil level and pressure gauge	Yes	Yes	Yes	Yes
Water temperature gauge	Yes	Yes	Yes	Yes
Ammeter	Yes	Yes	Yes	Yes
Key ignition switch	Yes	Yes	Yes	Yes

Power Units are the enclosed type, with industrial engines of proper horsepower and torque ratings.

TRAILER UNIT. All welded steel construction. Steel I-Beam axle. Steel hubs with roller bearings. Drop forged ring-type tow bar to fit Army-type pintle hook. Safety chains. Front and rear legs, front retractable jack-type with steel caster, rear adjustable for height. Automotive drop-center type wheels 6-ply Commercial pneumatic tires, ranging from 6.00 x 16 to 7.50 x 16 6-leaf springs of 3,500# capacity. Trailer equipped with combination tail light and number plate bracket, with tail light operated by toggle-switch on motor panel (stop light furnished when required). Tire tread widths range from 63" on TWC-6 to 72½" on TWC-915. Fenders and tool boxes are standard equipment. **EQUIPMENT.** Proper sheaves and high-capacity v-belts. Feed apron, chip spout, side delivery chute, 2-piece truck loading chute with chip deflector. Belt guard. Extra set of cutter blades with each unit. Tools furnished consist of necessary Allen wrenches, handle, 3 gauges, honing stone, can of grease, grease gun adapter. Operating and parts manuals. Fitchburg Chippers supplied with standard gray paint unless otherwise requested.

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Fitchburg Chippers provide extra *safety in operation*. The exclusive *Fitchburg Safety Spring* assures ease in chipping all wood sizes to the machine's rated capacity. This spring-activated feed plate "gives" with material entering the chipper—protecting the operator in case metal or other foreign material is accidentally fed. Another exclusive feature is the hinged feed apron which can be closed when chipper is not in operation.

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The Federal Highway Administrator, Bertram D. Tallamy, is now working on a report, to be made to Congress next January, dealing with this question of whether the federal government ought to reimburse the states for highways on interstate systems which were completed subsequent to Aug. 2, 1947.

While a good bit of the agitation against toll roads is probably based on political appeal to voters—using the bait of free use of highways now under toll—not all of them are really proving out as golden bonanzas. A recent survey by the New York *Times* indicated that most of them did not do very well this past winter. This was traced mainly to a shortage of truck traffic, which is the backbone of toll highway revenues during the non-tourist season. And there is some indication that the truckers are ganging up on the toll roads. A lot of truckers are staying off the toll roads where they can use alternative free highways in order to force a reduction or elimination of toll charges.

At the present time, there are less than 2,500 miles of toll roads in operation in the United States. But eventual plans (including about 1,000 miles under construction) call for more than 5,000 miles of toll roads.

Whether this picture will change, due to a combination of bad business prospects, political opposition, and alternative federal-aid inducements, remains to be seen. As far as public utilities are concerned, the relocation expense problem may become even more acute if plans for future toll roads are scrapped in favor of federal-aid highways.

As a matter of practice in the past, public utilities have been able to get reimbursement relief under toll road construction, as a general rule, because such expenses have been figured in as part of the cost of the entire project. Under the present confused situation, with respect to federal aid for highway construction, the chances for reimbursement will have to depend on state laws and state practice.

Government in Business

Overshadowed by more controversial issues now on the Washington scene, is the ever-current problem of federal government activities in the field of competitive and utility business enterprise. As usual, the utility phase of this question bears mainly on the electric power companies.

Just by way of a progress report, which telephone company people and other public utility folks might want to check, here is a brief run-over of several recent items of interest in this field. The principal trouble spot for federal power operations is still in the Pacific Northwest.

Last month, the U. S. Supreme Court refused to review the long-drawnout appeal by government ownership, labor union, and other organizations from a decision of the Federal Power Commission (FPC) authorizing the Idaho Power Co. to build three hydroelectric dams on the Snake River.

These dams, two of which are already under construction, are in the so-called Hells Canyon area, where the government ownership crowd wants the federal government to take the direct and exclusive responsibility of building a single federal high dam. But, Congress has repeatedly refused to authorize this project and its latest defeat was by senate vote of 71 to 41 in the last session.

Under the circumstances, the FPC thought there was no excuse for holding up the entire development just on the off chance that Congress might at some future time change its mind, especially while the Idaho Power Co. was ready, willing, and able to go ahead.

After a noisy and record-breaking "case," put on by the National Hells Canyon Association, an FPC examiner recommended that the licenses be issued to the electric company. An appeal was taken and the full FPC ruled the same way. Another appeal was taken and three judges of the District of Columbia U. S. Circuit Court of Appeals ruled the same way.

On motion for rehearing, nine judges of the U. S. Circuit Court of Appeals for the District of Columbia upheld the three judges. On further appeal, the U. S. Supreme Court, without any opinion, refused even to review the case.

One would think, after losing five rounds in a row, that the public ownership people would quit. But they are still keeping up a barrage in favor of another bill by Senator Wayne Morse (D., Ore.) that would set aside the FPC and the court decisions and authorize Uncle Sam to build the dams. The chances for such legislation being approved are nil, if for no other reason than the President would veto it if the bill passed the present Congress—which it won't.

One of the most remarkable remarks,

REA Approves Two Rural Telephone Loans

Over 900 families in rural areas of two states will receive initial telephone service and 485 will get improved service as result of $562,000 in loans made the week of April 8-12 by the Rural Electrification Administration. The U. S. Department of Agriculture announced on April 15 that the two REA loans were approved to companies in Illinois and North Carolina. Details of the loans follow:

Old Town Telephone System, Winston-Salem, N. C.; $349,000, fourth loan (April 9).

The borrower proposes to use these loan funds to furnish initial service to 753 subscribers. Funds are included in this loan also for additional warehouse facilities.

The four REA loans to Old Town totaling $1,705,000 will mean new and improved service to 3,823 rural subscribers. The system will consist of 387 miles of line and automatic exchanges at King, Lewisville, Old Town and Rural Hall. All of the exchanges are in operation, serving about 2,600 subscribers.

Mrs. Mamie A. Keiger is president of the Old Town Telephone System, and J. Lee Keiger Jr., is manager of the system.

•

Odin (Ill.) Telephone Exchange, Inc.; $223,000, first loan (April 10).

The borrower, a commercial corporation, plans to use this loan to convert its existing system, serving 391 subscribers and 94 switches, to automatic operation, and to serve 167 farm families now without telephones.

The Odin Telephone Exchange will acquire the facilities of three small switcher lines which it now serves. They are the Odin and Sandoval Township Telephone Co., Tennessee Prairie & Odin Telephone Co. and Switcher Line No. 75.

New facilities planned by the company include an automatic central office at Odin and 32 miles of line.

Carl Moore is president and manager of the Odin Telephone Exchange.

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Documented case histories of 50, 60 and even 80-year life from pressure-creosoted poles have convinced utilities of the unequalled "staying power" of creosote.

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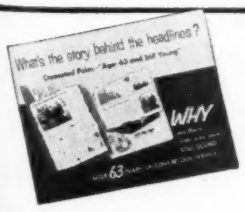

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however, in connection with this case was made by the general manager of the National Rural Electric Cooperative Association, Clyde T. Ellis, whose group participated in the appeals, when he said, "Hells Canyon yet will be built and the Supreme Court may yet reverse itself as usual."

On another site on the Snake River, the White House has let it be known that it is opposed to direct electric power dam building by the federal government where private companies are ready, willing, and able to go ahead. This case involves the Pleasant Valley site, for which the Pacific Northwest Power Co. has applied to the FPC for a license.

The FPC had heard testimony on this application and is about ready to hand down a decision. But Secretary of Interior Seaton wrote a letter to the FPC suggesting that its decision be deferred until his department took another look at possible plans for the federal government to build its own hydroelectric dam in that area.

Such a step would be at complete variance with the Eisenhower administration's "partnership" policy, designed to encourage private industry and other local interests to assume responsibility for hydroelectric power plant building and operation.

Rumor has it that FPC Chairman Kuykendall was so puzzled at the attitude of the Interior Department that he contacted the White House. In any event, the White House has let it be known that there is no change in the administration's attitude for encouraging private interest or anybody else to develop local area projects rather than leave it to the federal government. That is the way the matter now stands. And, the FPC will have to decide the Pleasant Valley application by either granting the private company license or denying it. Uncle Sam is now out of the picture.

A fuss involving the Tennessee Valley Authority (TVA) is boiling up for a showdown next month when one of the three members of the TVA board is due for replacement. He is Harry A. Curtis, whose term expires May 19. Curtis and his colleague, Raymond R. Paty, are holdover members of the TVA board appointed by former President Truman. They are very vigorous advocates of expansion of TVA dam building and power production, even though it would mean that the federal taxpayers would have to assume responsibility for the local power supply of Tennessee cities.

As a result, President Eisenhower's only appointee to the board, Chairman Herbert D. Vogel, a retired army general, has found himself in a minority

on his own board on major policy questions. President Eisenhower is expected to name a replacement for Curtis who will give General Vogel some support on his board.

But the exponents of TVA expansion and the public ownership crowd, in general, are all set to explode, if he does so. Whoever he names, Eisenhower's appointee will have to be confirmed by the Senate. The Senate is controlled by Democrats, in which the public power bloc has much influence. So it looks like a good fight and a toss-up on the outcome.

On another front, Budget Director Brundage has recently informed Congress that the Eisenhower administration will continue to shut down government operations that compete with private business.

He stated: "The decision to continue or discontinue an activity as being in the public interest should not depend primarily upon whether the product or service can be produced cheaper by the government."

Brundage appeared at a Senate Small Business Committee hearing, at which spokesmen for the paint and varnish industry urged shutdown of the Navy Department's paint manufacturing plants at Norfolk, Va., and Mare Island, Cal. The industry spokesmen contended the Navy has ignored congressional directives to shut down its paint manufacturing even though private business could supply all its needs at a savings.

The Budget Bureau is now studying proposals, Brundage said, to cut off a long list of government-operated "services" conducted by its civilian agencies. He stated that these include "laundries, commercial photography, custodial services, duplicating and photostating services, and many others."

Wall Street Aid to Small Business?

Edward T. McCormick, president of the American Stock Exchange recently told a Washington, D. C., audience that he was urging investment bankers to give small business firms more assistance in raising equity capital. He addressed the Washington Society of Investment Analysis at a luncheon meeting.

McCormick said in part: "If the financial health of our country is to improve and not deteriorate, far more serious attention must be given to facilitating the raising of funds for this classification of business."

Short-term funds are apparently available, he commented, without too much difficulty from the banks and the Small Business Administration. The problem, he added, is "the more serious one of obtaining from $500,000 to 1.5 million dollars of long-term capital on a national basis for plant expansion and the development of new and improved products at lower costs." What is needed, he declared, is equity capital "for debt could prove to be the deathknell of many of these companies in the event of an unforeseen recession in their business."

McCormick proposed that leading investment banking houses designate representatives for a special committee. They would provide "a continuing available group of experienced men with whom these small companies may come with specific problems for financing and to be able to receive appropriate guidance."

Emphasizing that while the federal government has given long consideration to the problems of these smaller companies, he said: "I don't think that we in the securities business should, or can allow the problem to rest there. I think we have a serious responsibility to try to find some practical answers to the equity needs of these small businesses."

Securities & Exchange Commissioner Armstrong, who was a guest at the meeting, asked McCormick if some companies would rather not list their securities on an exchange because of SEC regulations.

McCormick replied that many firms have unwarranted fears of SEC regulations, but on the other hand, he added, some companies are now seeking listing privileges because of tighter SEC proxy rules. He indicated that such rules protect management in the event of a control battle.

To another question, McCormick agreed that mutual funds could be a good source of equity capital for a small firm. He also agreed that too often a small firm has to refuse offers of new capital because management control is an issue.

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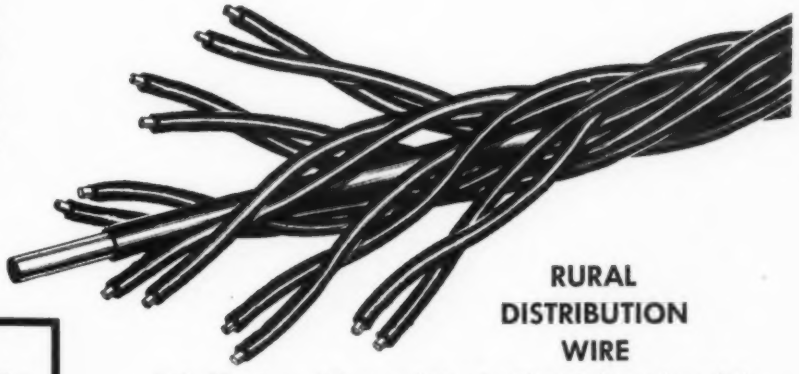

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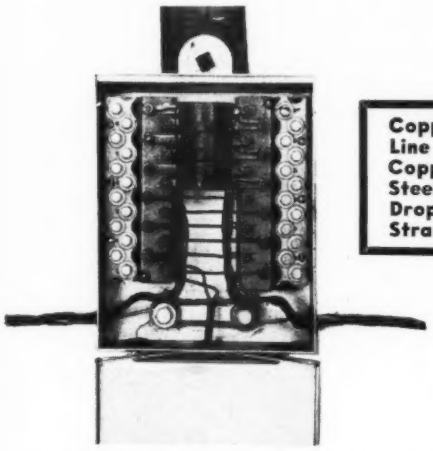
3, 6, 11, 16 pr., 19 ga conductors in either black or color coded. The ideal wire for expansion at low cost. Also Urban Distribution in 16 pr., 24 ga conductors. By Superior or PWC.



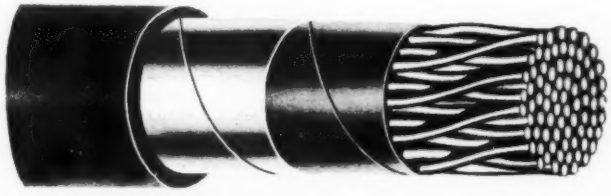
Copperweld Line Wire
Copper Line Wire
Steel Line Wire
Drop Wire
Strand

TYPE 177 TERMINAL LOADING CASE

By CEECO for use with Rural Distribution Wire. 6, 11 and 16 pair capacity, protected or unprotected. Designed to accommodate loading coils of 88MH or 44MH inductance.

"C" RURAL PARALLEL LINE WIRE

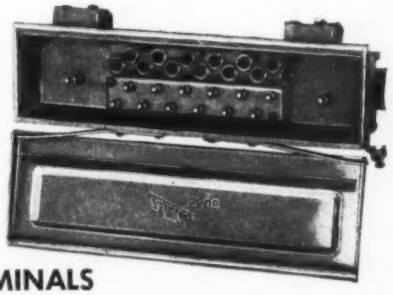
Two No. 14 or two No. 12 Copperweld conductors or two .083" galvanized steel conductors in Polyethylene insulation. Replaces open wire construction at less cost. Superior and PWC.



TEL-C AERIAL OR DUCT CABLE

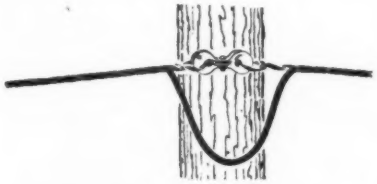
Superior cable in 24, 22 or 19 AWG conductors, 6 thru 404 pairs. Irradiated Polyethylene tape, aluminum shield, Polyethylene jacket. Also other cables on hand to meet your particular requirements.

Cable Supplies
Equipment
Hardware
Tools
Insulators
Poles & Arms



WIRE TERMINALS

Reliable and Cook protected and unprotected terminals. All types in stock.



PREFORMED PRODUCTS

Deadends, grips and supports for all wires and strands. Preformed for fast installation.

"C" RURAL TERMINAL

Drop wire terminal by Superior for making drops from "C" Rural Parallel Line Wires.

STRAND TERMINALS

11, 16 and 26 pair, protected or unprotected, plastic or lead stubs. Complete line of Cook and Reliable Terminals.

BUCKEYE TELEPHONE & SUPPLY CO.

Dept. T, 1250 Kinnear Rd. **Phone HU. 8-0655** **Columbus 21, Ohio**

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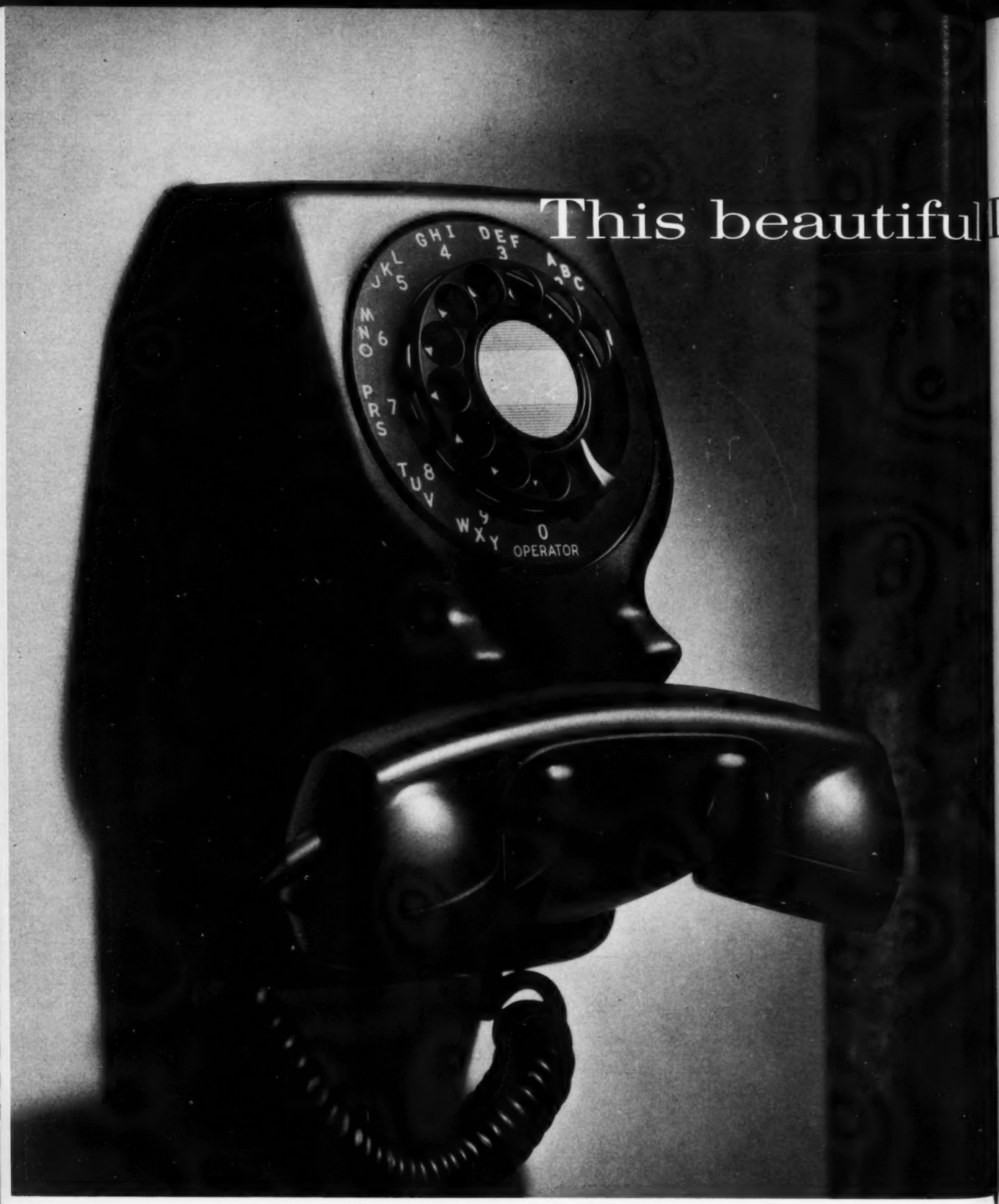

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LEICH SALES CORPORATION, 427 WEST RANDOLPH STREET, CHICAGO 6, ILLINOIS

LEICH wall telephone

is really a desk telephone!

SOME people DEmand wall mounted telephones. Show them this Leich 100 telephone and they'll be more than pleased with you and with your company.

And you . . . Mr. Telephone Man . . . can smile smugly to yourself . . . for all you've done is taken Leich's regular 100 desk telephone, turned it over and mounted in on the wall.

Dollars and centswise, what more could you ask for. Write today for the catalog and prices on Leich's 100 series telephones. You'll be glad you did.

manufacturers of telephones, switchboards and related apparatus since 1907

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GENERAL SYSTEM

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

A LITTLE paper-backed book that sells for $1.25, by John F. Rider Publishers, Inc., 116 W. 14th St., New York 11, N. Y., should prove a good investment for all communicators.

Authored by Dr. Alexander Schure, this little book deals with the fundamental nature of electromagnetic radiation covering various factors involved in the makeup and transmission of electromagnetic waves, with emphasis on the propagation of these waves.

It also describes and illustrates wave reflection and refraction, normal tropospheric propagation and scatter propagation. Numerous diagrams are used to clarify all points covered with a view to practicability.

•

Recently we had a report of a case wherein a high executive complained that when he made an important call and had stenographers take down the conversation in short-hand from an extension, he could not hear nor be heard properly.

An investigation disclosed that this executive had five stenographers on five different extensions on the line all taking notes when he made one of his important calls.

We have not been able to learn why so many stenographers were necessary as ordinarily one would suffice if she knew her Gregg. Perhaps they were not well qualified and it required the combined notes of all six to reconstruct the conversation.

Neither have we been able to learn why a voice recorder was not used unless this particular high executive believed in doing things the hard way.

•

A friend of the writer visiting a strange town recently was faced with the problem of having a personal check cashed.

He tried several cards he carried, plus his driver's license for identification, without success; then he pulled out his telephone credit card. This did the trick and the check was cashed without further question.

Apparently the bank considered that if his credit was good with the telephone company he should prove a good risk.

•

We examined a new type masonry drill recently which appears to have numerous advantages for use in drilling round holes quickly in tile, marble, terrazzo, brick, reinforced concrete, or granite.

These drills cut out a hollow core and the diamonds that afford its cutting surface are meticulously selected and placed in the seating metal. Electric drills may be used to bore holes from 1 inch to 4 inch O.D. Special drilling machines are available to cut holes up to 24 inches. Holes are drilled quickly, without dust, dirt or noise.

•

Someone has proposed the idea that radioactive material be included in some of the materials used in the manufacture of communication cables that are designed to be buried or laid in water. Then, a Geiger counter could be used to rapidly locate the cable in the event of trouble.

Although we do not profess to have a knowledge of radioactive materials or their uses, it would appear, however, that there are numerous tried and proved methods of locating underground cable which will prove less difficult and expensive.

•

In the March 2 *Plant Man's Notebook*, we published a letter from Burrell Taylor in which he described how he made use of a transformer to flash-test and locate wet cable trouble. Since this letter was published, we have received letters on this subject from several readers.

While the methods differ somewhat, it would appear that all agree on the success of this method of locating trouble.

We now have another letter from Mr. Taylor in which he furnishes the following additional information:

"Mr. Wagner stated in his letter that they have designed a simple 500 volt, direct-current power supply to break down cable trouble.

"I realize that dc is better than ac for two reasons: (1) ac has a tendency to heat the wires at the wet spot and dry the insulation instead of arcing through the insulation and welding the wires together and (2) ac is more dangerous to handle than dc.

"Mr. Wagner stated further that this system would not prove successful on plastic cable. Personally, I have had better luck flashing plastic cable than paper-insulated.

"Just recently, we had trouble in a five-pair plastic cable, where water entered a splice. When we located the trouble, the insulation had melted off the wires and a hole was burned through the splice covering. The trouble was easily located with an ohmmeter and by visual inspection of the outside of the cable.

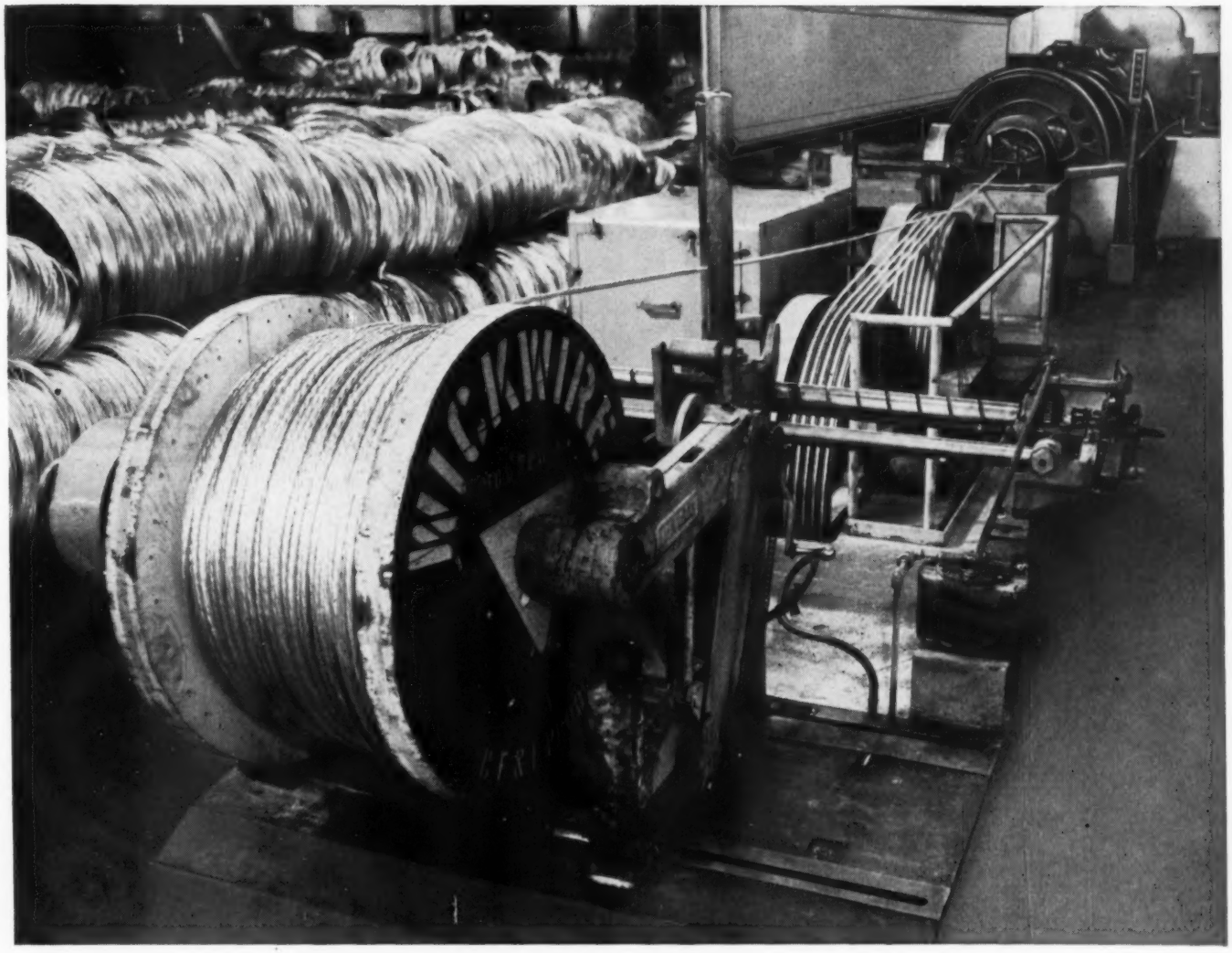
"The transformer I built operates on the same principle as an arc welder. When it is used, an arc is formed at the wet spot, welding the wires together. As you probably know, most arc welders operate from ac current though some do use dc."

We also have a letter from Paul P. Barnes, of the Leich Sales Corp., advising us that his company manufactures and sells a transformer designed for use on cable breakdown tests. This transformer provides for outputs of 350, 500 and 700 volts.

•

We are warned not to smoke in bed for the next ashes that fall on the floor may be our own.

XUM



CF&I GALVANIZED STEEL STRAND

quality
service
dependability

CF&I Galvanized Steel Strand assures quality, service and dependability. This strand is manufactured to ASTM Specifications A-122, A-363 or to your own specification in seven- and three-wire constructions. Next time you need steel strand for ground, messenger or guy wire applications, contact the nearest CF&I sales office for complete details.

CF&I GALVANIZED STEEL STRAND

THE COLORADO FUEL AND IRON CORPORATION

WILKWIRE — A CF&I PRODUCT

4613

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Chicago • Denver • Detroit • El Paso • Ft. Worth
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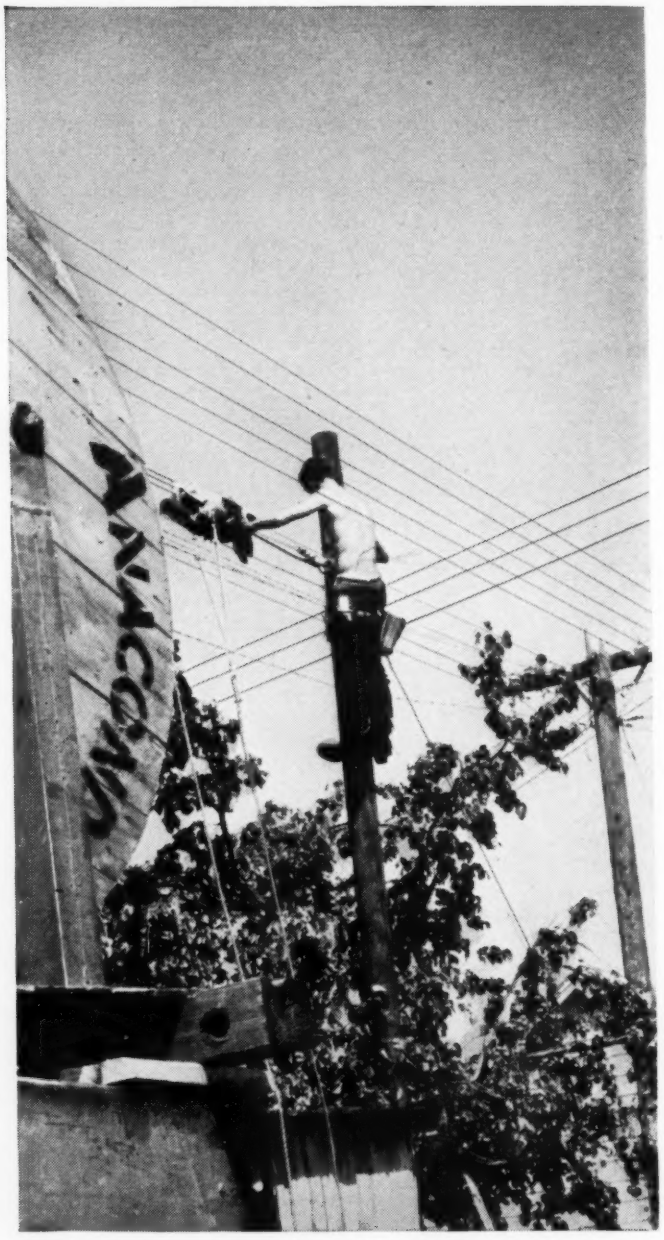
East . . .

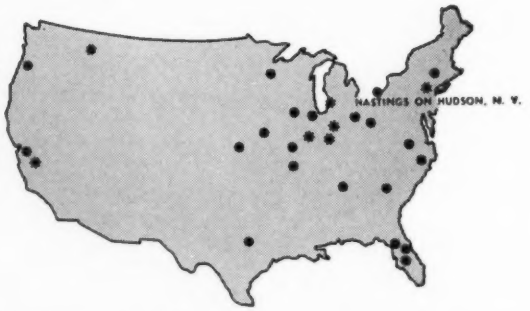
Atlantic Coast—Anaconda direct-burial telephone cable proves its toughness against corrosive soil conditions, moisture.

West . . .



Far West—Anaconda plastic aerial cable handles easily, is quickly installed.

Everywhere—Anaconda offers "on



Complete stock of standard items is maintained at Hastings and by Anaconda's distributors across the country. It's sold to telephone companies only by authorized telephone distributors.

What's your need? Prompt service? A helping hand with cable selection? Application assistance? The answer to a special engineering question?

For any of these, see the Man from Anaconda!

Anaconda's seven mills strategically located across the country, backing a national network of distributors, assure you prompt, accurate service—cable or wire *when* and *where* you want it.

At Anaconda, too, extensive research facilities are devoted, around the clock, to many of your cable problems. Anaconda is always ready and will-

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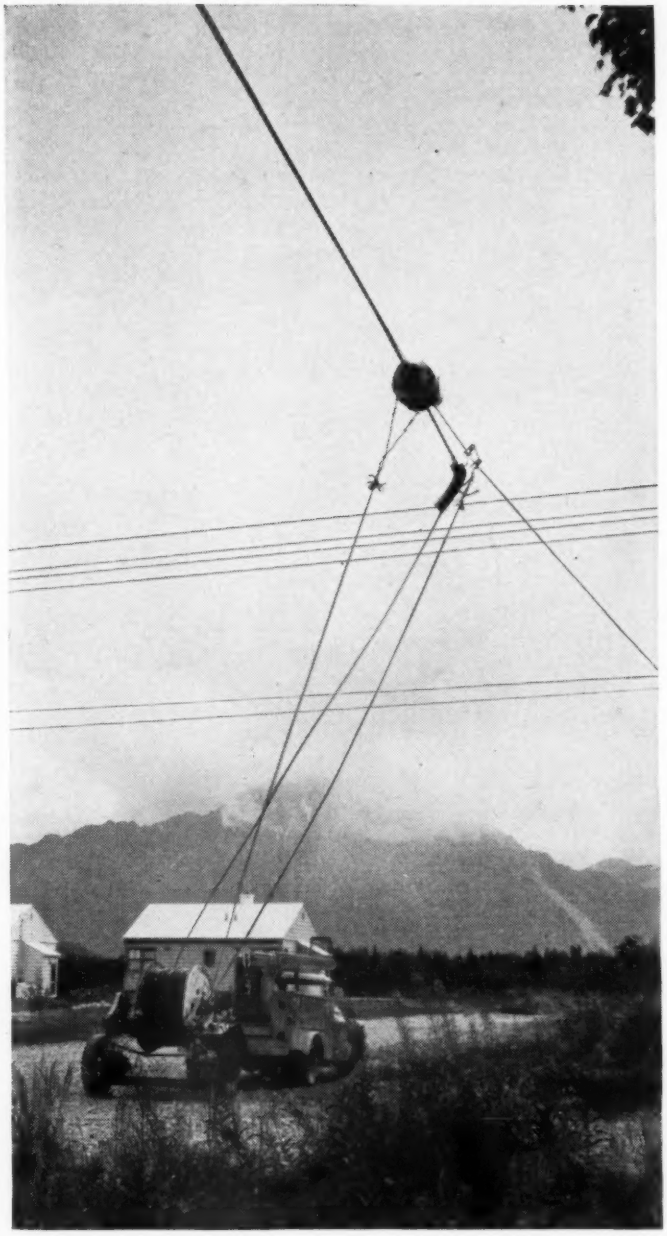
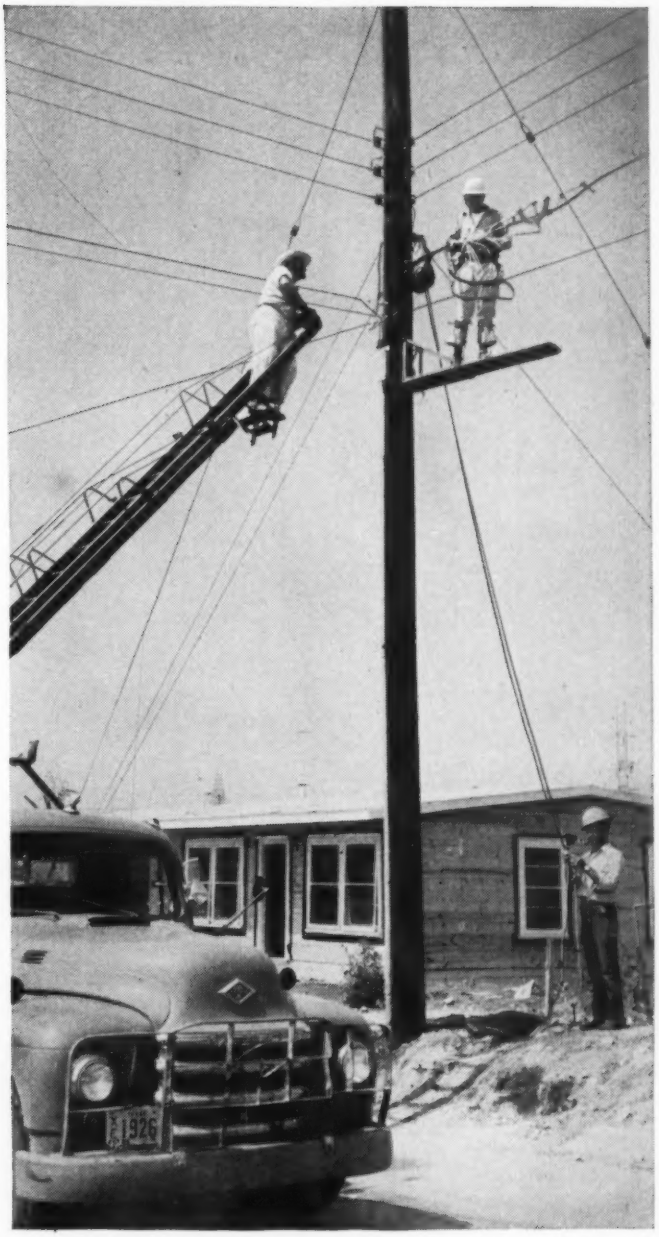
North . . .



Alaska—Anaconda telephone cable stands up, where temperatures really go down.

South



Deep South—under blazing sun, Anaconda plastic telephone cable is installed for long-life service.

call" service for telephone cable

ing to share the answers with you. In manufacture, quality-control procedures insure finest products!

On your next job—ask the Man from Anaconda or your Anaconda distributor for Anaconda cable: plastic aerial, direct burial or self-supporting cable, urban and rural distribution wire, or paper-lead telephone cable. Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. 57332

SEE THE MAN FROM **ANACONDA®**

FOR **TELEPHONE CABLE**

XUM

ABC of the Telephone

by Frank E. Lee

PART 81. OUTSIDE PLANT CONSTRUCTION—Section 7. Selection and installation of anchors.

Section 1. Planning of additions to outside plant (TELEPHONY, Nov. 17, 1956).

Section 2. Laying out the pole line, clearances to be maintained, and grading requirements (TELEPHONY, Nov. 24, 1956).

Section 3. Selection, treatment, handling, storage, and gaining of poles (TELEPHONY, Dec. 1, 1956).

Section 4. Items of power equipment used in pole line construction and maintenance. Also discussed depth poles are set in various types of soil (TELEPHONY, Dec. 8, 1956).

Section 5. Purpose of guy wires and factors involved in their proper placement (TELEPHONY, Feb. 16).

Section 6. Types of guy wires, how to determine guy loads, and the selection of guy strand (TELEPHONY, Feb. 23).

THERE IS a lot of truth in the statement that a guy wire is only as good as its anchor. In a sense, this is just another way of saying that the selection, proper location, and installation of an anchor is just as important as the location and installation of the proper size guy wire. One end of the guy wire usually is attached to an anchor in the ground. If the guy load is 15,000 pounds the load or pull on the anchor is on the order of 15,000 pounds.

If the anchor remains firmly in place it is reasonable that the guy wire will remain under the proper tension. If the anchor should slip, even a little, the guy wire will loosen and its effectiveness will be impaired. This should not be construed to mean that all loose guy wires are caused by anchors that have slipped or loosened.

However, since it is easier to set an anchor the correct way when it is first installed, rather than to have to reset it at a later date, care should be taken to select the right anchor and to install it properly at each guy wire installation.

Some years ago guy wires were attached to sections of poles buried in the ground as anchors. In most instances an anchor rod, long enough to extend about 6 inches above the ground line, was attached to the buried pole section and the guy wire was attached to the eye of the anchor rod.

From a cost standpoint, the log section required for an anchor is relatively inexpensive. However, because of the large amount of soil that has to be handled in preparing the proper size and shape hole to place a log anchor, the installed cost of these anchors is greater than the installed cost of a commercial anchor. Also, the commercial anchor, when used in soil for which it was designed, generally has greater holding power than the log anchor.

The type and condition of the soil in which an anchor is to be placed are important factors in determining the kind of anchor to be used and the way it is installed. In some areas, all types of soil will be found, and in other areas one particular type of soil may be predominant. Thus, when selecting or installing an anchor one must know the type of soil in which the anchor is to be placed. It is not enough, alone, to know the general or predominant type of soil in an area or community. The important fact is the type of soil immediately around the anchor.

For example, a pole line may be built along the base of one of the scenic sandstone bluffs found in Richland County, in southwestern Wisconsin. However, because of the work of the glacier that forced the bluffs up from the ground and the ages of nature's soil building, a combination of sand, black dirt, and possibly a little clay may be found at the spot where the anchor is to be placed. As a result, the soil holding power in this instance is the holding power of the sand, black dirt, and clay, rather than the holding power of an anchor set in sandstone.

In Union County, New Jersey, a layer of rich, red soil covers the rocky landward extension of the continental shelf of the Atlantic Ocean. This layer of soil very often has a depth of only one or two feet. Under these circumstances an anchor is likely to be set in rock or shale. As would be expected, rock or shale has a greater holding power than the porous red soil on the surface.

The following soil classifications have been included to assist in determining the potential holding power of the various types of soil in which anchors may be placed:

Classification Number	*Type of Soil*
1	**Solid hard rock.**
2	**Soft rock, sandstone, or shale.** Rock formations in this classification may be solid or in layers.
3	**Hardpan.** Hardpan is a material that may be regarded as rock in the process of formation. Clay that has become so hardened by heat or pressure that it is in the initial stages of turning into shale is hardpan. Sand that has been partially cemented by small deposits of iron oxide or carbonate of lime is also known as hardpan. Hardpan usually is dry, resembling

(Please turn to page 44)

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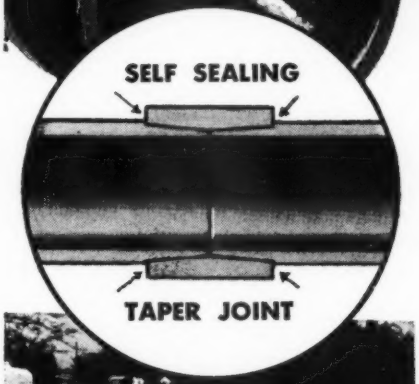
SMOOTH BORE!



Orangeburg Fibre Conduit Prolongs Cable Life

Protect cable sheath from abrasion and you prolong the life of underground cables, say utility engineers. Scoring of cable sheath creates "trouble spots" that shorten cable life.

That's where Orangeburg Fibre Conduit plays an important part in keeping cables healthy. Orangeburg's smooth bore, its low coefficient of friction minimize the danger of abrasion when cables are pulled in, as well as later on during cable movement. By protecting cable sheath from abrasion, Orangeburg Fibre Conduit adds years to cable life.

Orangeburg's impermeable wall and watertight joints protect cables from corrosive ground waters. Its nonmetallic material is strong, tough, resilient, long lasting.

And, remember, Orangeburg lays faster and at lower cost than other types of conduit. It is light in weight, easy to handle, easy to tool on the job. Spacers, bends, fittings, 5° bend sections and lightweight tapering tool, all combine to simplify installation.

Since 1893, records of long life have proved Orangeburg's durability and economy.

Orangeburg Fibre Conduit is distributed by Graybar Electric Company and General Electric Supply Company with branches and stocks in principal cities.

WRITE DEPT. T-47A FOR NEW CATALOG 52.

ORANGEBURG MANUFACTURING CO., INC., Orangeburg, N. Y. **West Coast Plant, Newark, Calif.**

ORANGEBURG®
FIBRE CONDUIT

"In beautiful colors . . ."

". . . so easy to hold . . ."

Millions watched her shop for telephones!

She's the lovely ballet dancer featured in one of the commercials shown on "Telephone Time," the Bell System's television show. Blithely and beautifully she danced her way through an enchanted store, choosing telephones for her family, her friends, herself. This month "Telephone Time" is beginning its second year on nationwide television. Every week its commercials will advertise what's new, different and desirable in telephones and telephone services. These commercials, we believe, are contributing to the sales efforts of the entire telephone industry. We hope that yours is one of the millions of homes this program reaches. It's on ABC-TV. Your local paper will give you the time and station.

BELL TELEPHONE SYSTEM

"... cords that s-t-r-e-t-c-h ..."

"... telephones, telephones, dream telephones!"

"In beautiful colors . . ."

". . . so easy to hold . . ."

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Millions watched her shop for telephones!

She's the lovely ballet dancer featured in one of the commercials shown on "Telephone Time," the Bell System's television show. Blithely and beautifully she danced her way through an enchanted store, choosing telephones for her family, her friends, herself. This month "Telephone Time" is beginning its second year on nationwide television. Every week its commercials will advertise what's new, different and desirable in telephones and telephone services. These commercials, we believe, are contributing to the sales efforts of the entire telephone industry. We hope that yours is one of the millions of homes this program reaches. It's on ABC-TV. Your local paper will give you the time and station.

BELL TELEPHONE SYSTEM

"... cords that s-t-r-e-t-c-h ..."

"... telephones, telephones, dream telephones!"

XUM

soft rock, and requires the use of a digging bar.

4 **Crumbling, damp.** Soil in this classification is primarily clay that tends to crumble when an attempt is made to squeeze it into a ball with the hands.

5 **Firm, moist.** In most cases, clay is predominant in this classification. However, the soil may also consist of stones, gravel, or sand, and will form a ball when squeezed with the hands. As a rule, most soils in well drained areas, other than hillsides, are in this classification.

6 **Plastic, wet.** In most instances, clay is predominant in this soil classification. In areas subjected to heavy seasonal rainfall, sufficient water is present for a long enough time to penetrate the soil to a considerable depth. Under these circumstances this condition may occur even though the area may be reasonably well drained. During these wet seasons the soil becomes plastic, and when squeezed in the hands can be readily molded into any desired shape. Usually this soil is found in flat country or near rivers or marshes.

7 **Loose.** Dry. Generally found in areas with very little rainfall where sand and gravel predominate. Built-up or filled-in areas in dry regions, or during the dry season, belong in this category. Generally, there is a lack of bonding material to hold the soil particles together, and as a result the soil remains exceptionally loose.

Wet. From the standpoint of holding power, loose, wet soil is the same as loose, dry soil. However, loose, wet soil usually contains a considerable amount of sand, gravel, loam, silt, or very wet clay. This soil, because of its porosity, absorbs considerable amounts of moisture during the rainy season or high tides—if found along the shore of the ocean—with a resultant loss in holding power. Soil in this classification is usually found in poorly drained areas and in locations where there is no drainage although the subsoil may be entirely of clay. Very soft, wet clay and peat are also included in this classification. In many sections of the country the terms soft clay and peat often are used interchangeably.

8 **Swamps and marshes.** Included in this classification are areas that are marshes only during certain seasons.

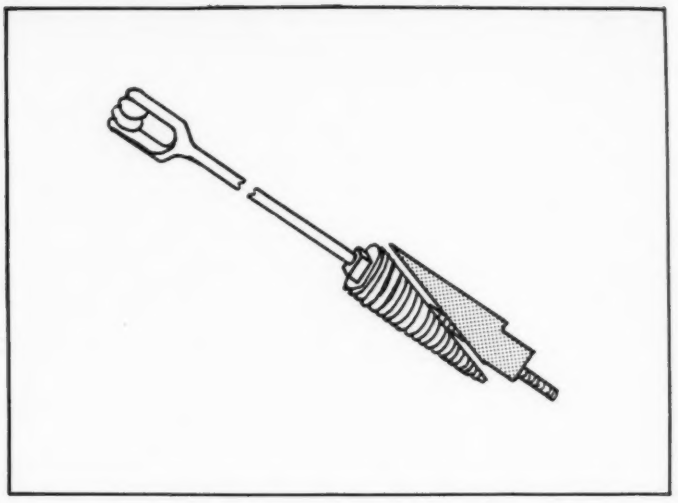

Fig. 1

After reviewing these soil classifications the next step is to consider the holding power of the various types of soil. A simple comparison of soil holding power can be made by inserting a number of machine bolts head first in freshly poured concrete, and then pulling out one of the bolts after various intervals of time during the setting process of the concrete. When the concrete is first poured, one of the bolts can be withdrawn very easily. This can be likened to pulling the bolt from swampy soil. As the concrete starts to set, its consistency changes from a loose wet mixture to a plastic wet state. At this stage greater effort is required to pull out one of the machine bolts.

In time the concrete will tend to crumble when one of the bolts is removed. However, a greater amount of effort will be needed to pull the bolt. At this stage the broken lumps of concrete will feel damp to the touch.

After 24 hours or so, the concrete will be hard but usually is not fully cured. At this interval the bolt could only be removed by pulling hard enough to break out a section of the concrete. At this point, in the setting process, the concrete is about like sandstone or soft rock. It is hard, but not as hard as it will become eventually.

Finally, after the curing process is complete, the concrete will be like solid, hard rock. Once completely cured, it is doubtful that a bolt can be removed unless the concrete is broken away.

A particular anchor location usually is not subjected to as wide a range of consistency change as was the concrete used in the preceding example. Perhaps the only significant change occurs with the change of the season when the moisture content of the soil increases or decreases. For this reason it is possible to select an anchor with the assurance that it will hold the load placed on the guy wire.

A number of factors must be considered during the selection of the proper anchor for a particular job. These factors are:

(1) The type of soil and the moisture content of the soil in which the anchor will be placed.

(Please turn to page 48)

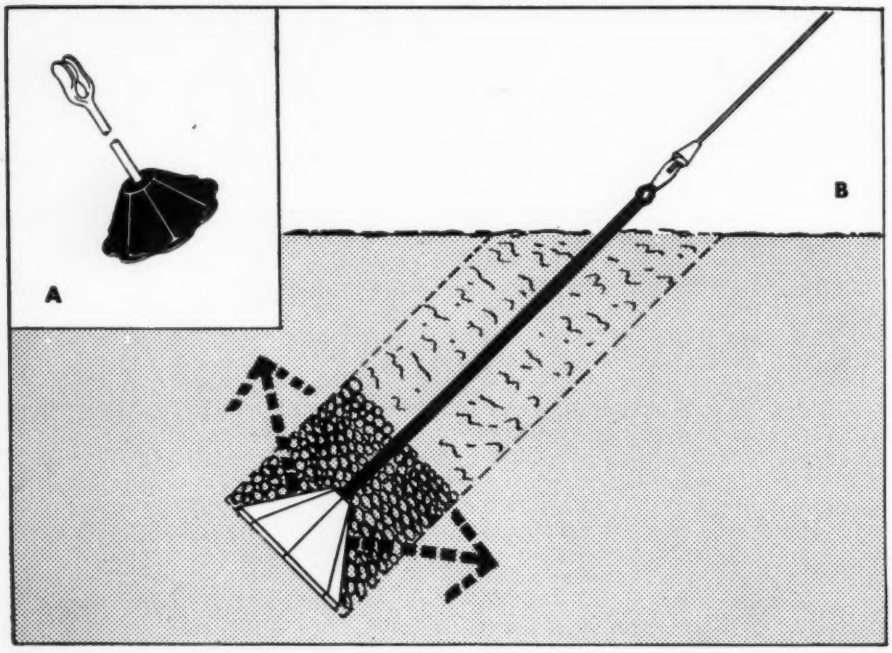

Fig. 2

NETWORK . . .

DEFINITION BY DR. SAMUEL JOHNSON (18th CENTURY)—Anything reticulated or decussated, with interstices between the intersections.

DEFINITION BY STROMBERG-CARLSON (1957)—The 6K-1 System . . . A fingertip PBX for your commercial subscribers.

Definitions change with the times. Our definition of a complete intercommunications network is *6K-1*. This system, like others on the market, offers your subscribers the numerous advantages of multi-line service plus the new Stromberg-Carlson intercom dialing feature.

Other features include: tie lines to connect one 6K-1 System to another; identifying lamp signals; office gray color instruments.

For sales aids and full information on the income-boosting aspects of the 6K-1, contact your Stromberg-Carlson representative.

S-C STROMBERG-CARLSON

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

GD GENERAL DYNAMICS

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

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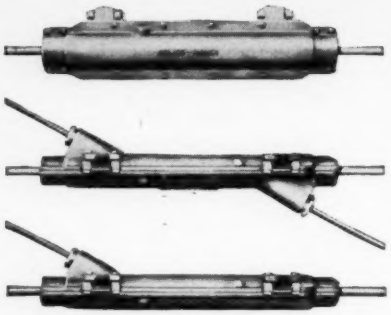
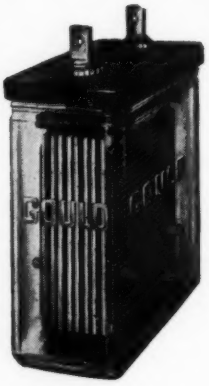
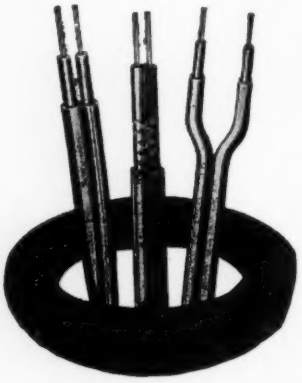


The Cook Splice Maker is a messenger-mounted unit for cold splicing of lead or plastic cable, .400 inch to 1.300 inches in diameter. Splice Makers are available in three models: through splice, Y branch splice and X branch splice. When ordering, specify cable diameter for correct size grommets. COOK ELECTRIC COMPANY.



Outstanding Battery Performance is yours when you choose Gould Planté Batteries. Thick, grooved, pure lead positive plates give many years of trouble-free service! Made by GOULD-NATIONAL BATTERIES, INC., the finest money can buy.



Long Service Life and Low Plant Costs go hand in hand with the installation of ENDURPRENE — The Neoprene Drop Wire available in both Copperweld and Bronze. This flexible and easy-to-handle wire is made by GENERAL INSULATED WIRE WORKS, INC.

The Time-Tested Steel Strand. A ductile, adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection against corrosion in INDIANA STEEL & WIRE COMPANY'S Crapo Steel Strand. Minimum maintenance expense.

ARE DELIVERED

No delays when you order from Kellogg! An experienced professional telephone man handles your order promptly. You know you are getting the best, too. 60 Years of experience stands behind the selection of these line supplies.

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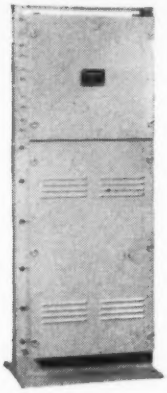
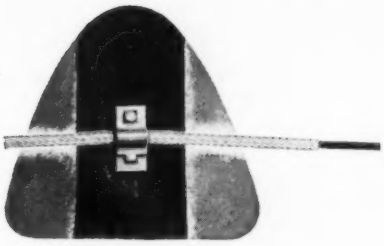


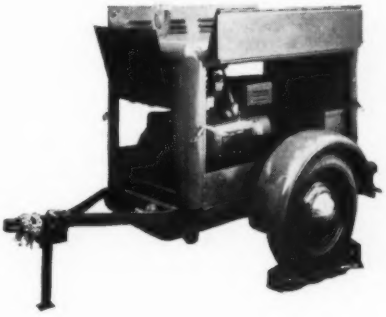
H-5 Subcycle for Harmonic Ringing Frequencies. Produces all frequencies in harmonic series, 16⅔, 25, 33⅓, 50 and 66⅔ cycles. Ringing frequencies locked to AC line frequency. Maintenance-free operation. A product of LORAIN PRODUCTS CORPORATION.



Preformed Line Guards for Plastic Self-Supporting Cable. No tools required. Line guards are accurately formed to fit snugly without using clamps or clips to hold ends secure.
PREFORMED LINE PRODUCTS COMPANY.

HOLIDAY 24

Wire Terminal offers new simplicity in connecting single pair between drop or bridle wire, and RD or urban distribution. No need to cut RD wires when connecting—merely skin and terminate. Long-life, flexible, neoprene, weathertight cover, stainless steel mounting clamp, and ruggedly molded phenolic body. Made by RELIABLE ELECTRIC COMPANY.



Maintenance Generator—Equipment includes toolbox, fuel tank, safety chain and chocks, taillight and reflectors, and sheet-metal house with hinged sides, hinged front cover. Available with or without generator —92" long, 53" wide, 51" high. With generator, weighs 800 lbs. S & G MANUFACTURING CORPORATION.

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Chicago 38, Illinois
REliance 5-5445

4501 Truman Road
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410 N. Syndicate Avenue
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Nestor 5878

1515 Turtle Creek Blvd.
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1555 West Fourth Street
Mansfield, Ohio
Mansfield 7-2816

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A DIVISION OF I T & T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
A Division of International Telephone and Telegraph Corporation
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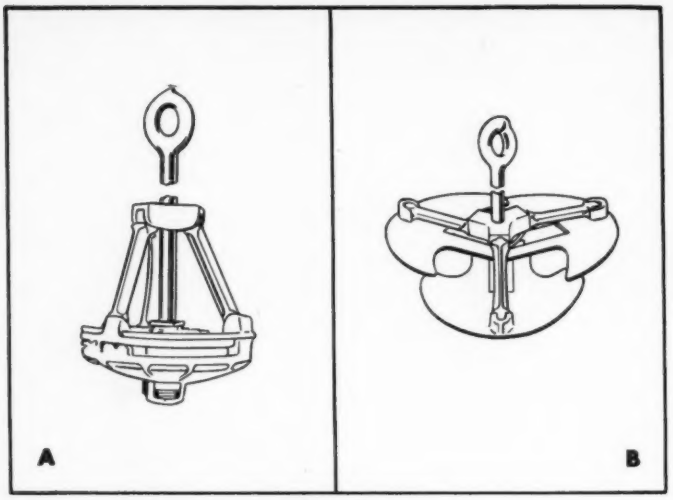


Fig. 3

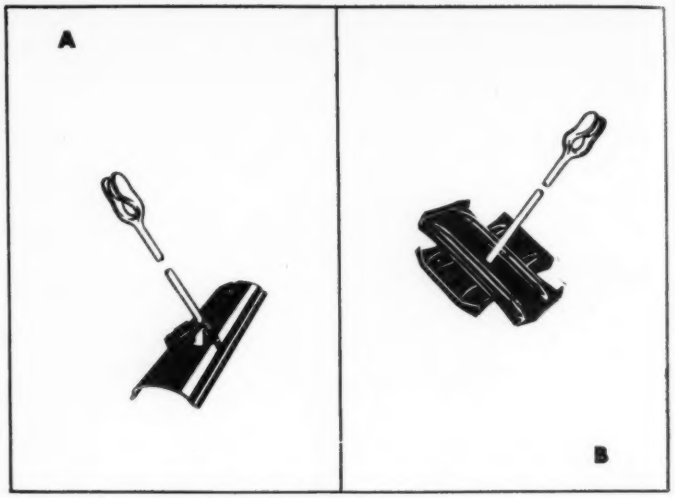


Fig. 4

(2) The load on the guy wire, which also amounts to the load on the anchor.
(3) The methods to be used in placing the anchor, such as whether the anchor holes will be dug by hand or with an earth boring machine.

The typical anchors used in the following illustrations are made in a wide variety of sizes. As a result, it is possible to select the most suitable anchor for a job, giving due consideration to the type of soil and to the calculated guy load.

Anchor for Solid Rock. An expanding anchor that has a wedging section, similar to the anchor shown in *Fig. 1*, is very effective in solid rock. After this anchor is inserted in a drilled hole, the anchor rod is turned to force the jaws of the anchor against the edges of the hole. Once the anchor is set, it tends to wedge tighter against the rock as the pull on the rod increases. This anchor depends upon the amount of bite that the expanded jaws exert against the edge of the hole cut into the rock. If the rock is too soft, it will crumble as the anchor bites into the wall of the hole.

Cone-Shaped Anchor. The cone-shaped anchor, shown in *Fig. 2A*, is used in Class 2, 3, 4, and 5 soil. When this anchor is installed, a thick layer of stones is tamped in place over the cone before the rest of the hole is filled. The taper of the cone and the flat edge surfaces on each side help the rock fill to form an effective wedge against the sides of the hole. *Fig. 2B* illustrates how the wedge action of the cone utilizes the holding power of the undisturbed soil around the hole.

Expanding Anchor. The expanding anchor, shown in *Fig. 3A*, is expanded as illustrated in *Fig. 3B*, after being placed at the bottom of a small hole. In this way, the outer edges cut into the undisturbed soil around the base of the hole. After being expanded the anchor has a wedging action, similar to that of a cone anchor. This type anchor can be used to advantage in Class 3, 4, 5, 6, and 7 soils.

Single-Plate Anchor. The single-plate anchor with anti-creep guards welded to the surface of the anchor to prevent it from moving after it is installed, illustrated in *Fig. 4A*, is very efficient for normal guying conditions. Anchors of this type are designed for installations where the pull will be against solid, undisturbed earth. Under these conditions they are not dependent upon back-filled earth or tamping for their holding power. Anchors of this type can be used effectively in Class 3, 4, 5, 6, and 7 soil.

Two-Plate Anchor. Two-plate anchors, similar to the anchor shown in *Fig.* 4B, are used for heavy-duty anchoring. Anchors of this type have greater holding power than a log dead man anchor of corresponding size. In addition, they can be installed for less than half the cost of a log anchor. These anchors are designed for installation in machine-bored holes. The same size hole used for the pole generally is adequate for the anchor. This feature has many advantages because there is no time lost in changing auger bits as the line truck moves from the pole location to the spot where the hole is to be drilled for the anchor. These anchors also can be used in Class 3, 4, 5, 6, and 7 soils.

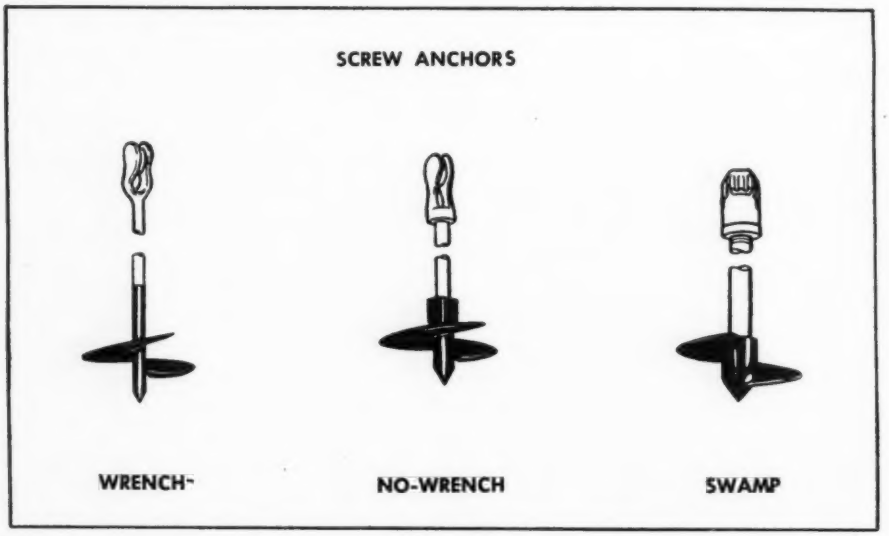


Fig. 5

Screw-Type Anchors. Screw-type anchors, illustrated in *Fig. 5*, are generally used in sandy soil, Class 7, or in swampy or marshy regions, Class 8. They are available in two basic designs. One type is installed by hand with a standard screw anchor wrench. The other type is designed for installation with a screw anchor adapter which can be attached to power earth boring equipment. The screw design of the anchor plate enables these anchors to be installed with a minimum of disturbance to the soil. They can be removed by turning the screw in the opposite direction. This feature makes them especially suited for use at temporary guy wire installations.

The main difference between the

(Please turn to page 80)

What's *New* about this Guy?

The big new facts about Copperweld* Type M Guy Strand are its economy and its convenience.

Copperweld always has cost less per year of service. Now, this low annual cost is still lower, because prices of every size of the new Type M Guy Strand are lower.

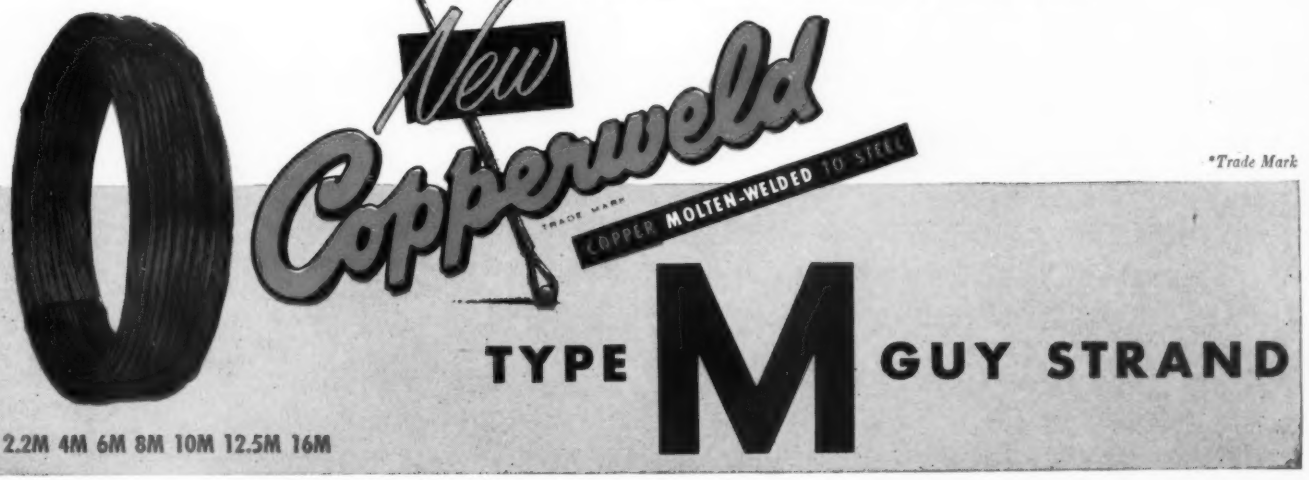
Two Copperweld achievements make this possible:

- First, a special new guy strand developed through Copperweld research enables us to meet tensile strength specifications with smaller diameters.
- Second, new guy strand production techniques appreciably reduce the cost of manufacture.

The new Type M Guy Strand is pliable—easy to handle. It can be readily bent, served, moused or clamped. The time-proved Copperweld process, by which the thick copper sheath of each wire is inseparably molten-welded to the steel core, gives full assurance that the copper will not crack, flake or peel.

Type M Guy Strand is available in 7 strengths: 3-wire strand in strengths of 2.2M and 4M; 7-wire strand in strengths of 6M, 8M, 10M, 12.5M and 16M—and sold in coils of 250, 500 and 1,000 feet. Our field engineers will be glad to tell you about the new economies you can realize through its use.

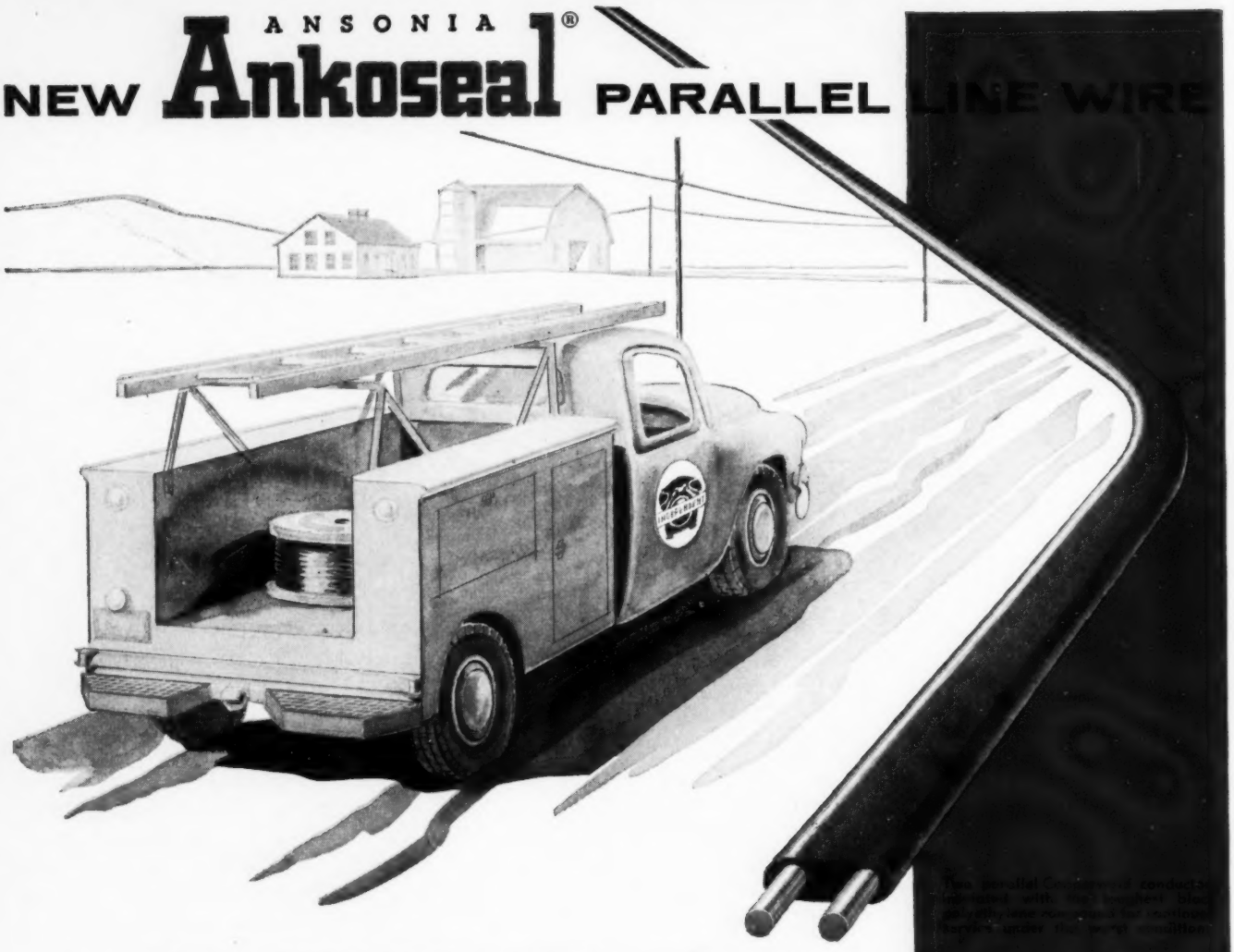
COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York



*Trade Mark

ANSONIA®

NEW Ankoseal® PARALLEL LINE WIRE



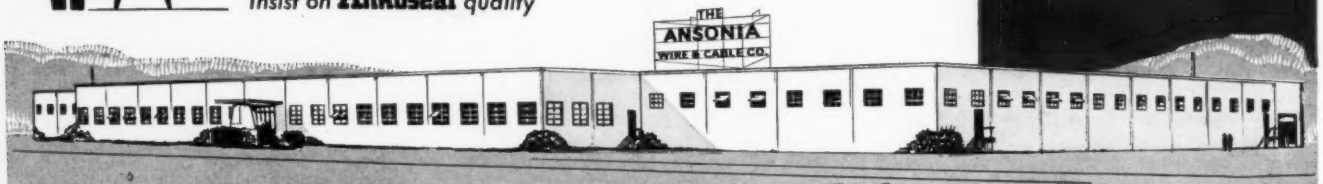
Answering The Call For Quality!

Ansonia's enviable reputation for quality is emphasized once again in this new product. You simply will not find parallel line wire that gives better transmission qualities and takes a beating in the open the way Ankoseal Parallel Line Wire does!

Install your span lengths to absolute maximum with a feeling of complete security even to heavy loading zones. Transposing ANKOSEAL Line Wire is simplicity itself . . . simply twist the desired number of turns between poles. Highest quality transmission characteristics can be obtained and cross talk eliminated in rural areas.

Ansonia Ankoseal Two Conductor Parallel Line Wire is available in #12 or #14 AWG in 5,000 or 15,000 foot reels.

Insist on ANSONIA **Ankoseal** *quality*



THE ANSONIA WIRE & CABLE COMPANY · ASHTON · R. I.

The Oldest Name In Plastic Telephone Cables In The Most Modern Plant Devoted Entirely To Producing Plastic Cables

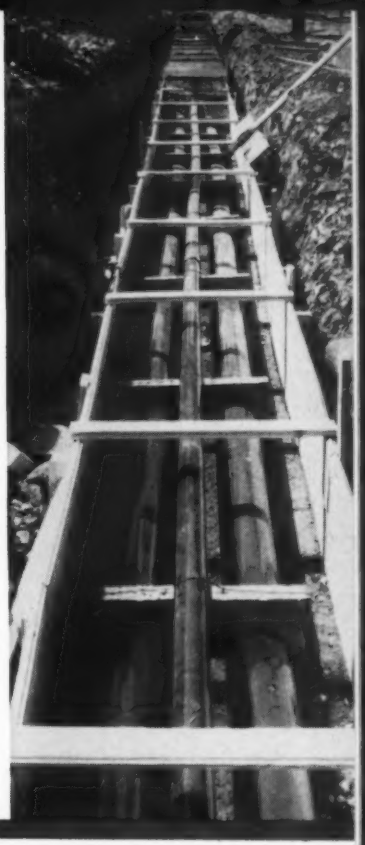
XUM

Butyrate conduit means direction changes without fittings

The semi-rigid nature of Tenite Butyrate allows the engineer maximum flexibility in planning and revising—since many direction changes can be made without costly and job-prolonging fittings.

Butyrate conduit means resistance to corrosion

Conduit of Tenite Butyrate is unaffected by corrosive and electrolytic action of soil. This is your assurance of many years of trouble-free service.



What can conduit of Tenite Butyrate plastic mean to you?

Conduit made of Tenite Butyrate plastic means many things to many utilities—for use in carrying both electric power and telephone cables.

To Long Island Lighting Company, Hicksville, N.Y., for example, Butyrate conduit meant resilience—which enabled it to meet conditions encountered in filled-in marsh areas. Conduit of Tenite Butyrate "gives" with ground movement instead of parting or fracturing.

To other companies it may mean: freedom from corrosion, high impact strength, non-inductance, ease in cutting and joining, extra-smooth walls, or semi-rigidity.

All of these benefits of Tenite Butyrate plastic are available to you—plus the economies in installation and maintenance which accompany them.

Discover how you can share in these benefits. For complete information and a list of suppliers in your area, mail the coupon below.

1932—EASTMAN'S 25TH YEAR IN PLASTICS—1957

Butyrate conduit means lightness in weight

Conduit of Tenite Butyrate is extremely easy to handle, thanks to its light weight. A 20' length of 4" conduit can literally be carried "with one hand behind your back."

TENITE
BUTYRATE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC.
subsidiary of Eastman Kodak Company, Kingsport, Tennessee

Please send me information on cable conduit made of Tenite Butyrate and a list of companies manufacturing Butyrate conduit and fittings.

NAME_____

POSITION_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

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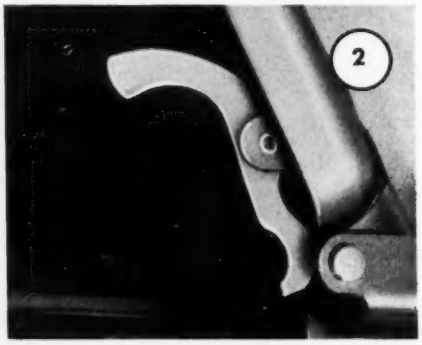
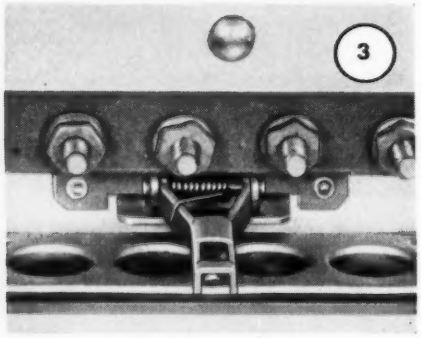
Stranterm

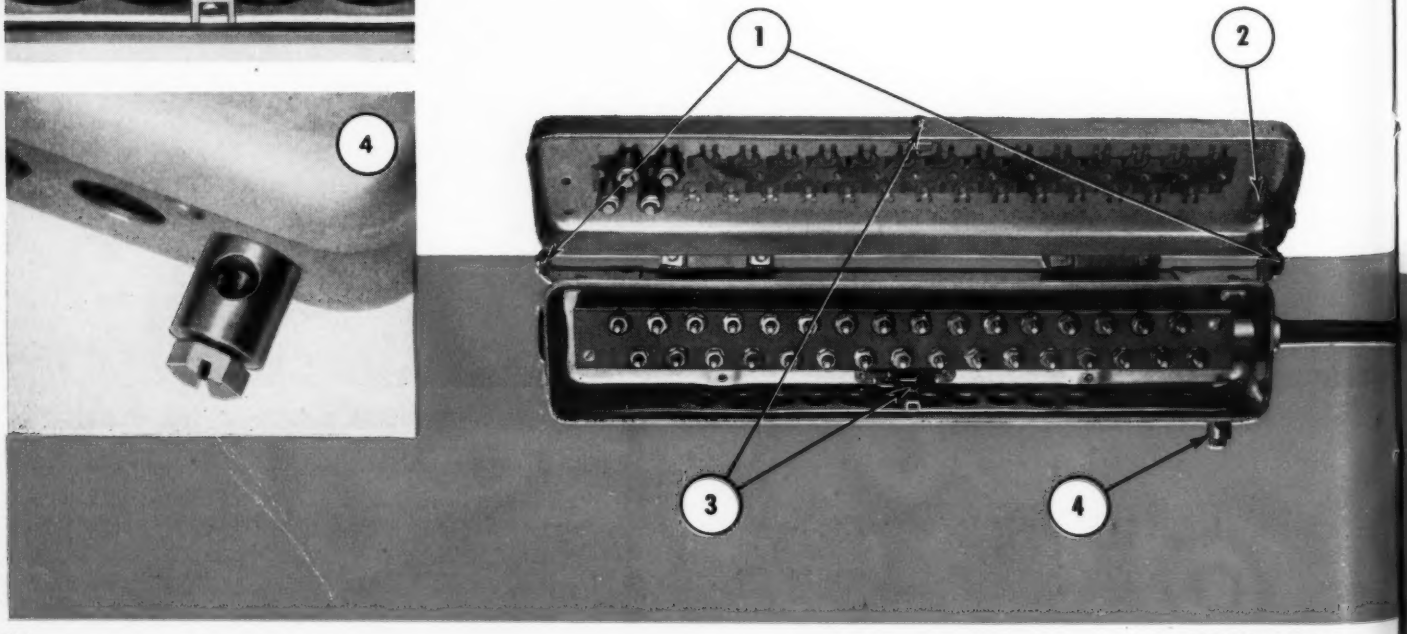
FIRST SHOWING OF





IMPORTANT IMPROVEMENTS WHICH THE 1957 MODELS WILL FEATURE

1. **WIDE ARC COVER HINGE:** Which makes interior of terminal more accessible for servicing. Hinges are of heavy stainless steel construction and reinforced.
2. **AUTOMATIC COVER STOP:** Which holds cover in fixed, open position while terminal is being serviced.
3. **PUSH BUTTON COVER LOCK:** Makes interior of the terminal readily accessible without use of tools and positively locks cover against impact or vibration.
4. **HEAVY DUTY GROUND STUD:** Conveniently located for outside wiring of No. 6 bare or insulated ground wire when applying protection.



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THE 1957 MODEL WITH IMPROVEMENTS FOR THE FUTURE

Distributors will soon be showing the new 1957 Stranterms in three new body styles, and capacities ranging through 6, 11, 16 and 26 pair sizes.

The new Stranterms are provided with an alodized, aluminum alloy, drawn metal body. Door latching members and cover supports are interior positioned. The doors are arranged to lift and set in a raised position while the terminal is being serviced. When ready to close, the latch is released, and the door is "pushed home" where it is rigidly locked. Inland Testing Laboratories tests show this terminal to be weather-proof and rain tight when deluged with water. The terminal is light in weight, easy to install and very convenient for connecting or changing drops. It is furnished with either lead or plastic stubs. Stranterm also features an ingenious bell shaped cable nozzle which eliminates cable breakage due to excessive right angle bends.

The Stranterm is the only Strand Mounted Terminal which may be initially installed unprotected and can later be protected optionally, on a pair by pair basis by the easy insertion of snap-in Minigap or Mytigap Arresters as determined by the outside plant engineers' requirements. We suggest that you try a Stranterm today and investigate the economies and improvements now made possible in your outside plant construction.

today's

Highlights

of finance-taxes-business trends

by Willard F. Stanley

FUNDED DEBT INTEREST MARKS TIME—Unusual steadiness has continued in the level of interest yields on offerings of new utility funded debt issues during the last 30 days and more. The AT&T "straight" debenture issue has come and gone, receiving a ready reception. While the yield of 4.3 per cent on these debentures was the highest paid for AT&T non-convertibles in decades, it is significant that this rate compared favorably with the yield of 4.65 per cent at which the similarly rated New England Telephone & Telegraph Co. (AT&T subsidiary) debentures were offered early in January at the time of the interest yield debacle.

Stability of the new issues in recent weeks is indicated by Wall Street Journal tabulation of 15 utility funded debt offerings, which shows average yield on bid prices, at Apr. 12, 2 decimals (.02 per cent per annum) below the average yields based on offering prices. Of these issues, 10 showed lower yields on current bids. Short term money rate also held fairly steady and the Federal Reserve has been quiet lately as to policy.

Best informed "guestimate" for the future appears to be a continuance of interest yields at about present levels with a chance for a modest lessening in yields during the summer. Estimates of expansion expenditures both for utilities and industrials point to marketing a somewhat greater amount of funded debt securities in 1957. A well informed source places this increase at around 4 per cent. But most of this increase may already be accounted for by new issues to date. Also this factor may be more than offset by the estimated drop in construction of new housing units of between 20 per cent and 25 per cent for this year compared to last.

As of Apr. 1, schedule of forthcoming offerings of funded debt in April and May showed a decline of about 40 per cent for utilities and about 20 per cent for all companies, as compared with similar advance schedules shown at Feb. 1 with respect to February and March—according to the Investment Dealers' Digest. The comparison is confused, however, as to industrials, by the fact that these concerns seldom announce financing more than a month in advance.

(Please turn to page 58)

Mr. Stanley, formerly financial vice president of Southwestern Public Service Co., an electric utility with over 160 million dollars in assets, is president of Corporate Services, Inc. of New York City. He is a member of Controllers Institute of America and New York Society of Security Analysts. He serves on three committees of the Controllers Institute having to do with federal taxation, social security and finance management. His articles are appearing once a month in TELEPHONY.

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CENTER TERMINAL IS POSITIVE
EVEREADY
TRADE MARK
COLUMBIA
TRADE-MARKS
GRAY LABEL
LONG LIFE
TELEPHONE CELL
This dry cell is the original telephone cell greatly improved and is built especially for telephone use. It delivers long service life with uniformity and dependability in the highest degree.
A
NATIONAL CARBON
PRODUCT
MADE IN U.S.A
The Most Widely-Used Telephone Dry Cell In The World
The terms "Eveready", "Columbia", and "Gray Label" are registered trade-marks of Union Carbide and Carbon Corporation
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A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.
District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

ALMOST ANY WAY

YOU PUT IT...

RIGHT INTO THE

XUM

IE CRADLE IT GOES!

It's Automatic's famous "Walking Handset", one of the most popular features of the Type 80 Monophone. This distinctive telephone is shaped so the handset just "walks" right into place.

Which practically eliminates "off-hook" complaints—and thereby saves a great many maintenance trips.

We suggest you talk to a man who's standardized on Type 80 Monophones and ask him how many trips it saves *him*. Ask him about Type 80's *low* maintenance, too, and about its time-saving, easily-accessible parts, and its temper-saving Installer's Hooklock. And don't forget to inquire how his subscribers like Type 80's smart styling, easy dialing, and lifelike transmission. You'll see why so many telephone men are buying Automatic's Type 80 Monophone!

Be sure to get *your* order in today. Address:
Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.

AUTOMATIC ELECTRIC

A MEMBER OF THE GENERAL TELEPHONE SYSTEM

ONE OF AMERICA'S GREAT COMMUNICATIONS SYSTEMS

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An important contributing cause to the peak in interest rates for funded debt set early in January, 1957, was the accumulation of issues throughout the Holiday season resulting in a plethora of offerings in the week commencing Jan. 7. The glut of new issues was so great as to cause underwriting firms to increase yields, fearing the oversupply might demoralize the market. This aspect of the interest pinnacle could have been avoided by cooperation among the issuers to reschedule some of the offerings at later dates, where funds were not needed immediately. Prospective issuers should look ahead at future offering schedules and make sure their securities will not reach the market at the same time as too many others. During May, there are several weeks when substantial aggregate amounts of funded debt are scheduled by two or three utility issuers within two or three days. But, a check with two leading underwriters of utility securities confirms our judgment that in none of these periods are the issues large or numerous enough to distort interest yields, assuming market conditions remain normal.

Continued new offerings of senior securities on a normal basis, to raise funds needed in the near future, seems to be indicated as wise procedure. Nothing in the offing should justify either haste or delay in marketing issues of this category.

As to common stock equity issues, the green light is still shining. Despite the large number and amounts of common stock issues marketed in recent months (mostly on a subscription basis to stockholders), these issues have been well received. Yields and price-earnings ratios are still satisfactory for issuers and deferral of raising equity funds needed in the next year or so would seem justified only if a marked improvement in prices can be expected in the future, due to substantially increased earnings or other special causes.

* * * *

SPRING FEVER IN STOCKS—The flowers that bloom in the Spring have been notable by their absence. With blizzards and tornadoes abounding, the Spring resurgence has been left to the stock market, which has recently registered a moderate gain. About half the loss since the year-end has been recovered and the 50 stock New York Times average showed at April 19 a level about 3 per cent below the average at Dec. 31, 1956. At both Mar. 25 and Feb. 16, comparable decline had been about 6 per cent, thus indicating a 3 per cent increase in the last month. We look for continuation of relatively static market conditions into and through the summer with swings in the averages limited to not over 5 per cent either way.

* * * *

1956 INCOME TAX DECISIONS—Completing our report as to some of the outstanding income tax decisions during 1956, there was a case holding that moving a sick man to aid his morale is not deductible. Deduction of cost of a trip to change environment was also denied in another case. In both these cases, the IRS contended these were not proper medical expenses, but a decision favorable to the taxpayer was entered for the deduction of a cost of a trip to Florida, but not meals or lodging. The latter case seems inconsistent with the others, unless, in that particular instance, the Florida climate was considered necessary to improve health, thus making the cost of transportation a medical expense.

A decision was rendered that contributions to defeat adverse legislation were not deductible; and yet another decision held that the depreciable base of property given to a utility by a community was not fair value but cost, even though what it paid the community was a nominal amount.

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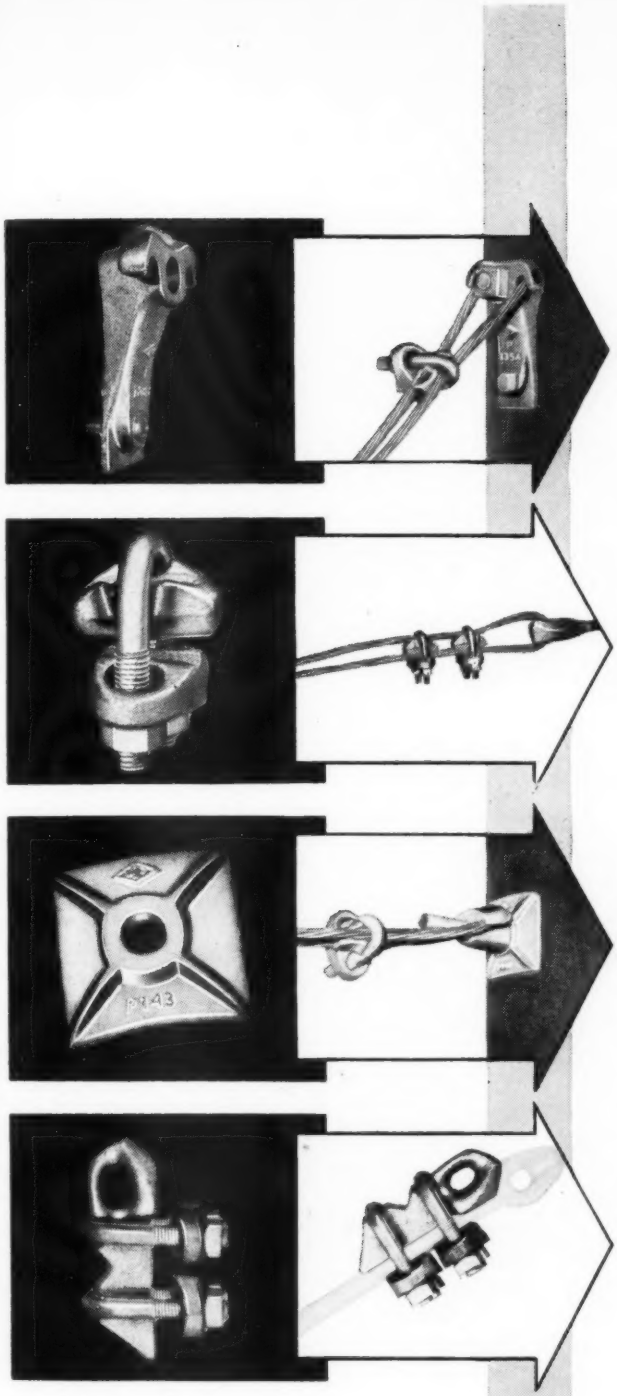

Make your guying EASIER, QUICKER, STRONGER, at less cost with

MIF

MALLEABLE IRON Pole Line Hardware

MIF Guy Hooks are so designed that a large portion of the vertical and horizontal components of the load are transmitted to the pole, placing the bolt in tension and thus relieving it of much of the shear and bending forces. The wide heel pad resists overturning, an integral wedge and spurs resist vertical movement, and the channel shaped back provides the best fit on the pole. Made-up guy loop is easily and quickly slipped over the hook at any time during construction and cannot come off unless rotated back to the engaging (horizontal) position. Solid one-piece construction puts every ounce of metal where it will do the most good.

MIF Guy Clamps feature lower weight and cost per unit of holding power—can be placed on the strand in a matter of seconds without disassembling—no special tools required. Clamping force of the "come-along" type grip increases as the load increases—for greater holding power. The wide range of strand diameters accommodated by each size reduces handling and inventory.

MIF Washers are specifically designed to assure top performance of hardware on the structure (for example, to help set the MIF Guy Hook most securely), to provide maximum effective bearing area and strength per unit of weight. Center hub and radial ribs reinforce the washer where it is needed—metal is placed in accordance with strength requirements.

MIF Span Guy Hooks, Thimble Bolt Eye Nuts, Auxiliary Eyes, etc., all of engineered construction, round out the full line of MIF Guying Hardware. Get the details by writing for our new illustrated price list.

MIF

SINCE 1854

POLE HARDWARE DIVISION

MALLEABLE IRON FITTINGS CO.

BRANFORD, CONNECTICUT

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Hugo Sales Co., Minneapolis, Minn. Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill. • Lee-Smith Co., Miami, Fla. • Line & Cable Accessories, Ltd., Toronto, Ontario, Canada • B. H. McCoin, Knoxville, Tenn. • William J. O'Brien, Memphis, Tenn. • Robert P. Smith & Co., Jacksonville, Fla. E. A. Thornwell, Inc., Atlanta, Ga. • J. P. Voight, Summerville, S. C. • Waltham, DeWitt & Krusi, San Francisco, Cal. • L. G. Wendegatz, Kansas City, Mo. • Williamson Sales Co., Shreveport and New Orleans, La., Dallas, Houston, Tex.; Pine Bluff, Ark. • O. C. Witte Co., Detroit, Mich.

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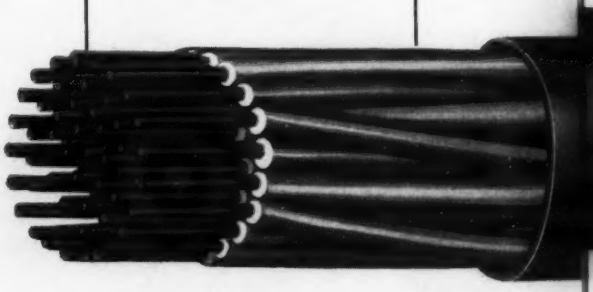
MEET A NEW MEMBER OF A FAMOUS "N

PHELPS DODGE THERMOPLASTIC EXCHANGE AREA TELEPHONE CABLE

FOR AERIAL, DUCT AND DIRECT BURIAL USES



Exchange Area Telephone Cable, Aerial and Duct Type
(Supplied with protective aluminum armor and outer polyethylene jacket when intended for direct burial)

The controlled craftsmanship and quality of Exchange Area telephone cable are typical of the entire line of Phelps Dodge thermoplastic telephone wires and cables including:

Self-supporting telephone cable
Rural distribution telephone wire
Urban distribution telephone wire
Inside wiring telephone cable

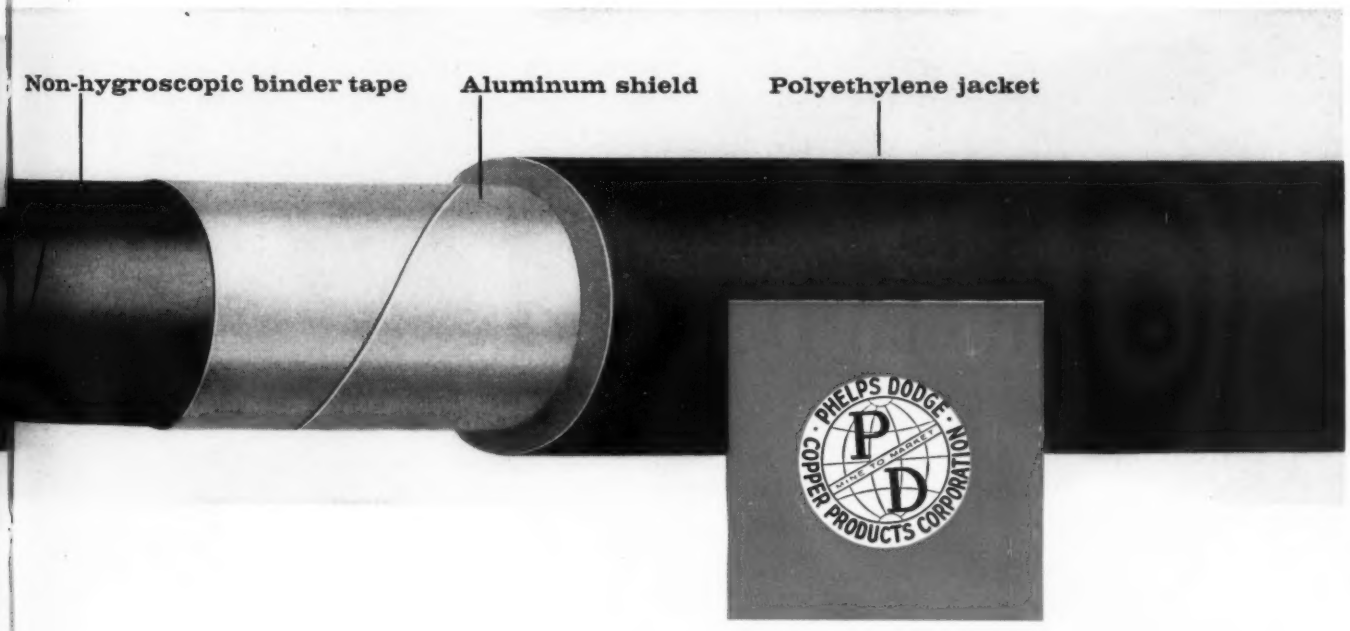
"FIRST FOR LASTING QUALITY—FROM MINE TO MARKET"

XUM

"MINE-TO-MARKET" LINE...

- Soft annealed copper conductors of highest grade copper from Phelps Dodge's own open pit mines.
- Highest quality polyethylene compounds for insulation and jackets assured by top grade materials and Phelps Dodge's vast experience in the plastic wire and cable field.
- Unique "lay pattern" that virtually engineers cross talk right out of the cable.
- Electrically continuous aluminum shielding tape.
- Special non-hygroscopic binder tape of laminated rubber and Mylar* that provides superior dielectric strength between core and shield, extra mechanical protection to the cabled assembly.

**Mylar—Du Pont's polyester film.*



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Maj. Gen. J. D. O'Connell, Chief Signal Officer, discusses operation of the transceiver with WAC Private First Class Vivian K. Hudgins of Beneta, Ore. The transceiver is similar to those used in the electronic data processing system which transmits and receives information as part of the Logistical Reporting Network. This net is now in operation between four key signal depots and The Army Signal Supply Agency in Philadelphia.

Line Communications in the National Defense Effort

By REAR ADMIRAL J. N. WENGER, U. S. Navy
Deputy Director for Communications—Electronics
Joint Staff, Joint Chiefs of Staff

IT IS A WELL KNOWN fact that the military services maintain extensive and highly integrated systems of communications. The extent to which the services depend upon the commercial carriers, however, is neither generally understood nor fully appreciated. Actually, within the continental limits of the United States, point-to-point communications for the military services are provided, as a matter of policy, by leasing lines from domestic commercial communication companies. This policy has been in effect for approximately 25 years and was developed after considerable experience with various methods of communication.

After World War I, there was a tendency for the military services to use their own radio facilities within the continental United States. It soon became apparent, however, that radio could not provide the same degree of flexibility and diversity of distribution that the domestic telephone and telegraph commercial carriers could provide with their extensive networks. The cost, in money and manpower, of duplicating such flexibility and diversity and of maintaining the necessary reserve capacity for sudden emergencies, would be excessive for the military services. Another, and equally important factor, in favor of line communications was the growing congestion in the radio spectrum. The limited number of radio frequencies available had to be conserved for overseas use and for mobile communications. Thus, the use of radio for domestic point-to-point communications gave way to leased commercial lines.

The soundness of the policy mentioned above was demonstrated in World War II and became even more

Where is the Guy who put up this guy?

He's doing something else—
maybe he's putting up another one.
Anyway, he did this job all alone
in less than five minutes—
by himself.

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This STRANDVISE guy was put up complete before any tensioning tools were applied to the strand

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evident in "Operation Alert 1956." This was an exercise which presented communications problems which would be encountered in the various phases of damage to existing facilities resulting from a wide scale bombing attack on the United States. It was evident during this exercise that the U. S. communications carriers, through experience gained in World War II and various emergencies, such as hurricanes or floods, had already taken many protective measures to insure continuity of communications. Some of these steps were the development of alternate routing plans, provision of emergency power, and relocation of vital operations to points outside the immediate perimeter of large cities.

In appraising the results of "Operation Alert 1956," Dr. A. S. Flemming, Director of Defense Mobilization, stated:

". . . it must be concluded that only with the combined and coordinated efforts of government and industry could the tremendous communications requirements, which would be associated with a condition of enemy attack, be met with any degree of success.

"Only those who have actually worked with the entire national communications resources and all of its varied media can appreciate the flexibility and degree of coverage which can be marshalled to meet conditions where a segment or portions of everyday facilities are disrupted."

The extent of the use of commercial lines by military activities can be illustrated by consideration of the requirements of various defense operations. For example, the Continental Air Defense Command is the largest single user of telephone type service in the United States. Wire communications used by the Air Defense Command are now approximately 600,000 channel miles.

In addition to the need for conventional telephone and telegraph communications, the air defense of the U. S. has produced a requirement for a more rapid means of transferring intelligence. The Semi-Automatic Ground Environment System (SAGE) is a project for applying semi-automatic operation to handling of information and direction of weapons. It includes means of converting radar information into signal form which can be transmitted automatically and carried over Class II telephone lines.

When the concept of SAGE was developed, one of the basic assumptions made by the scientists was such that such a system was feasible in the continental United States only because of the existence of a network of commercial communication lines that has no counterpart in any other part of the world. This network represents a private capital investment of nearly 16.5 billion dollars. Since 1945, it has been growing at a rate of 1 billion dollars a year. For example, the AT&T 1957 program calls for the installation of three million channel miles of long distance telephone facilities and 2.8 million channel miles of teletypewriter service. SAGE will require leased communication services costing about 157 million dollars a year.

REAR ADM. J. N. WENGER

At the present time, the Air Force is leasing lines for all military purposes from about 600 telephone companies, 20 of which are in the Bell System and 580 of which are Independents.

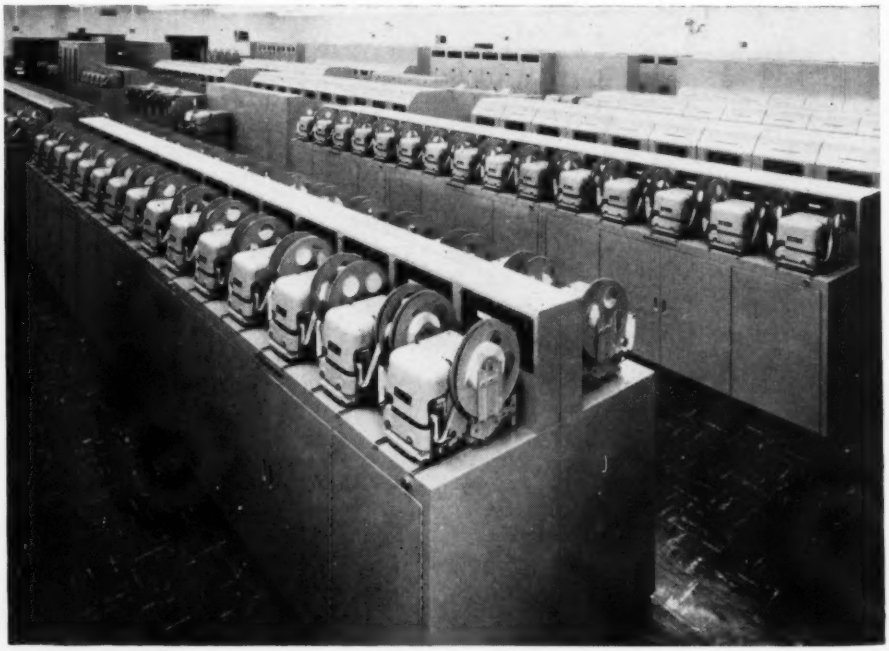
All Strategic Air Command (SAC) bases within the continental U. S. can be reached quickly by telephone facilities which are leased from commercial sources. Telephone circuits to Europe and Alaska are also now available through commercial sources.

The Alaska submarine telephone cable is the result of coordinated effort by the Army Signal Corps and the AT&T. This cable was opened for service in December, 1956. The AT&T portion covers 900 miles from Port Angeles to Ketchikan while the Signal Corps portion extends 350 miles from Ketchikan to Skagway. The provision of this cable has added to the flexibility, security and reliability of U. S.—Alaska facilities.

In addition to voice and printed messages, the SAC system of communications utilizes photographic, or "graphics," transmission.

This network operates throughout SAC and numerous overseas installations through leased commercial facilities which terminate on government-owned equipment. This system will eventually provide for the rapid and secure passage of information in the form prepared by the originator. It should also eventually make possible more rapid and accurate transmission of information than is possible with present-day equipment and effect considerable savings in the manpower required to run communications centers. The lively civilian interest in this method promises rapid and substantial improvements in techniques.

The operational use of data transmission, as exemplified by SAGE, has a counterpart in the logistics field. The Army's Electronic Data Processing Sys-



View of automatic teletypewriter switching center, Davis Communication Station. Monitor units located in foreground. Cross-office units in middle rows, and incoming line units in background.

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tems (EDPS) involves full scale exploitation of electronic computers in logistics, including supply, financial and personnel management, record keeping and research and development. The Army controls about one million items of supply. A substantial part of the complex problem may be solved through mechanization of control point operations by means of data processing systems.

Based on a study of subscriber density, the United States Army Signal Corps devised a plan to establish a data processing system which would be used to satisfy all army requirements for data transmission. This system is known as the "ACAN Switched Transceiver Network." It became operational on Nov. 5, 1956.

Within the United States, leased telephone circuits interconnect the telephone company switching centers at Philadelphia, Atlanta, Chicago, Kansas City and Oakland. Connected to these switching centers by leased telephone circuits are 48 military installations. Army-owner radio facilities are utilized between certain gateway installations in the United States; such as the Overseas Supply Agencies at Brooklyn, N. Y., and Fort Mason, Cal., the Adjutant General's Office, Washington, D. C., the 56th AG Machine Record Unit, San Francisco, Cal., and Ft. Lewis, Wash., and Europe, Panama, Hawaii, Japan and Alaska.

Data transceivers are utilized to exchange punched card information between all military installations on the network. Direct card to card transmissions are employed between many military installations on the network within the United States. A card relay function is performed at the gateway stations in the United States to permit the exchange of punch card information with overseas installations. An estimated million card transactions can be handled on the world wide network daily.

Most of the technical services are now utilizing this network to process supply requisitions and related data within the United States. The Overseas Supply Agencies at Brooklyn, N. Y. and Ft. Mason, Cal., Project MASS (Modern Army Supply System) are processing supply requisitions and related information to overseas locations. Requisitions are handled in 30 to 40 days less time than they were before this network became operational. Requisitions which took weeks to process are now handled in days and those which took days have been trimmed down to hours.

The Adjutant General is using this network to process personnel assignments within the United States and

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overseas. An estimated 30 days has been eliminated in the handling of personnel transfers. Cards are sent through processing centers and men report directly to their new assignments. It is estimated that over a million military personnel will be administered by this system. Later an additional half million civilian personnel may be similarly handled.

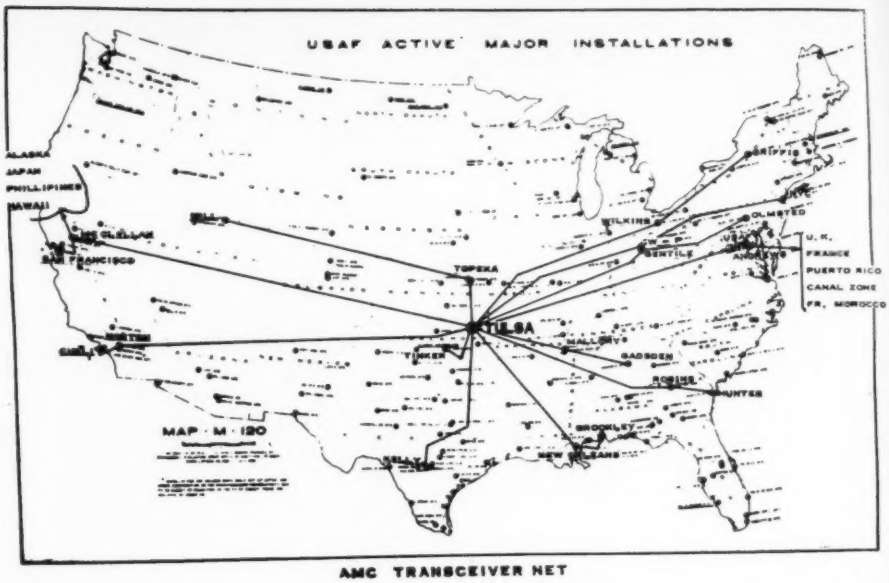
Savings are expected through greater over-all efficiency and reduction of the time required to process and transmit information, requests, orders and reports. Further savings will result from the reduction of materials in supply pipelines and amount of materials stocked in depots.

Studies are underway to determine how the "ACAN Switched Transceiver Network" can be utilized in the transition of peace to war. Plans are underway to convert the existing manual switching system to an automatic switching system within the next two years. It is envisioned that the automatic switching system will be utilized for all data and facsimile transmissions as well as for administrative voice purposes.

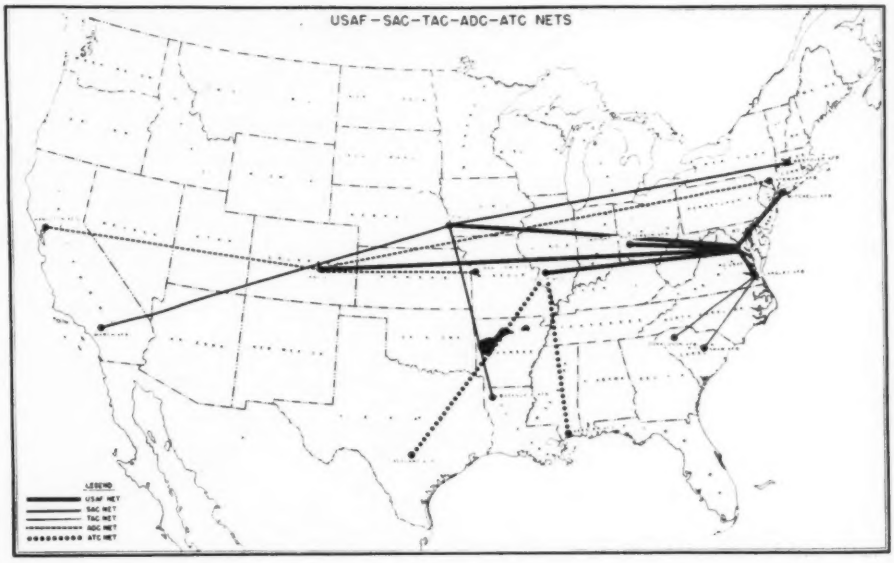
Based on operating experience gained from electrical transmission of personnel data between Norfolk, Va., and Washington, D. C., the Bureau of Naval Personnel has extended data transmission connections to personnel accounting and distribution activities on both coasts of the United States. The first overseas connection via navy radio was to have been activated on Apr. 1, 1957. Extension of data transmission capabilities to personnel accounting machine installations at all naval district headquaters, training centers, receiving centers and air training commands in the continental United States is planned for the relatively near future.

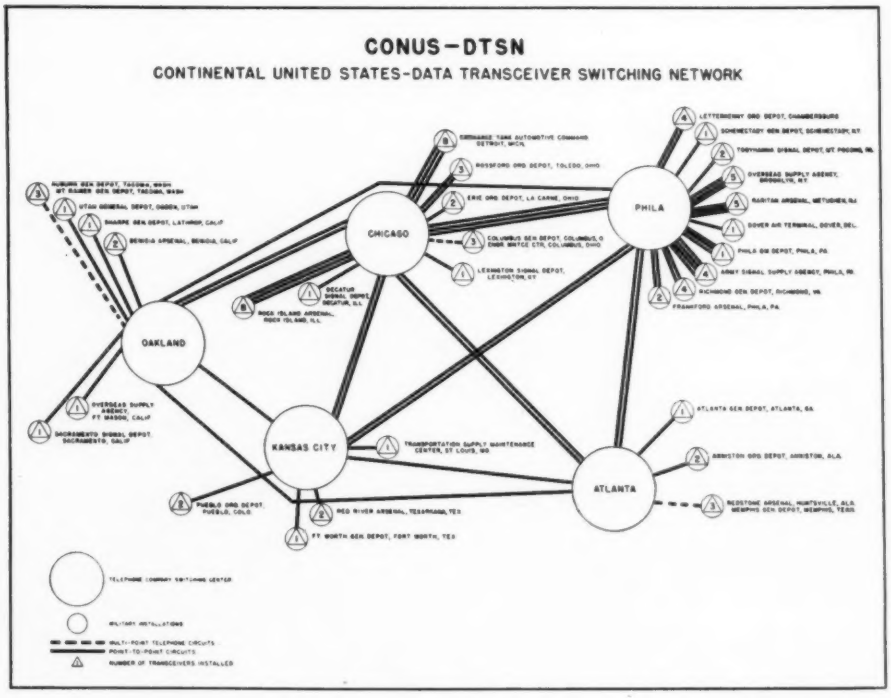
Naval aviation supply activities are making increasing use of data transmission for handling of requisitions and other supply functions. The Aviation Supply Office in Philadelphia has data transmission connections to supply stocking activities at Corpus Christi, Tex.; Pensacola and Jacksonville, Fla.; Cherry Point, N. C.; Norfolk, Va.; Lakehurst, N. J.; Quonset Point, R. I.; and San Diego, El Toro, Alameda and Oakland, Cal. The Bureau of Supplies and Accounts as well as other bureaus and offices of the Navy are analyzing operations to determine other areas where data transmission can be employed advantageously.

In order that development of data transmission may proceed in an orderly and economical manner, the Secretary of the Navy has issued instructions,



AMC TRANSCEIVER NET





giving policy, procedures and responsibilities, and has directed that "aggressive plans and action shall be directed toward a fully integrated navy-wide communications network for transmission of business and logistics data."

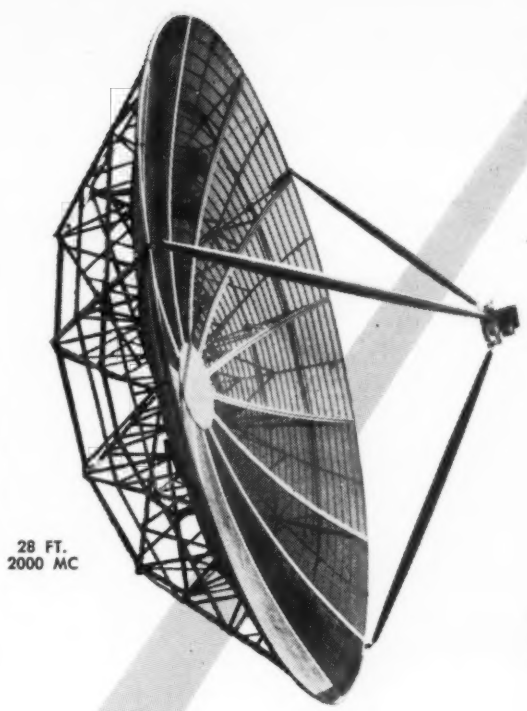
The Air Force has a service-wide plan for data transmission similar to those of the Army and Navy. Applications include requisition and supply of material, reporting of personnel data, weather data reduction, and forecasting and intelligence data reduction and analysis.

The Air Force Material Command (AMC) makes extensive use of data processing transmissions over a net radiating from Tulsa, Okla. Circuits of this net go to the following air force installations:

Topeka, Kan., and Hill Air Force Base, Utah; San Francisco, Cal., and McClellan Air Force Base, California, with connections to overseas installations in Alaska, Japan, Philippines and Hawaii; Norton Air Force Base, and Cheli Air Force Base, California; Tinker Air Force Base, Oklahoma; Kelly Air Force Base, Texas; New Orleans, La., and Brookley Air Force Base, Alabama; Robins Air Force Base, and Hunter Air Force Base, Georgia; Mallory Air Force Base, Arkansas, and Gadsden Air Force Base, Ala.; Andrews Air Force Base, Maryland, with overseas connections to U. K., France, Canal Zone and Morocco; Gentile Air Force Base, Ohio, and Olmsted Air Force Base, Pennsylvania; Wright-Patterson Air Force Base, Ohio, and New York City; Wilkins Air Force Base, Ohio, and Griffiss Air Force Base, New York.

A part-time data transmission net connects Air Force Headquarters in Washington with the major operational commands (Strategic Air Command, Tactical Air Command, Air Defense Command and the Air Training Command). This net uses leased telephone lines during the low traffic periods of the night. Similar nets connect the major operational commands with their immediate subordinate commands in the Continental, U. S.

The Strategic Air Command Headquarters at Offutt Air Force Base, Nebraska, has a net connecting March Air Force Base, California, Barksdale Air Force Base, Louisiana, and Westover Air Force Base, Massachusetts. The Tactical Air Command Headquarters at Langley Air Force Base, Virginia, is connected to Donaldson Air Force Base and Shaw Air Force Base in South Carolina. The Air Defense Command Headquarters at Ent Air Force Base, Colorado, is netted with Hamilton Air Force Base, California, Grandview Air Force Base, Missouri,



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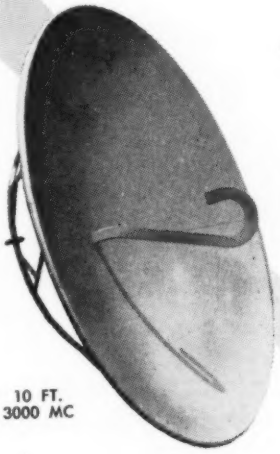
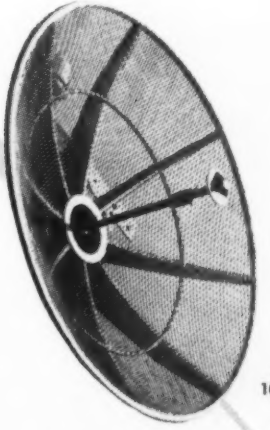
First to pioneer design and manufacture antenna systems for private, commercial and military services, Prodelin is the simple answer to all your difficult propagation problems!

Prodelin produces and stocks a complete line of service-proved antennas in various diameters up to 28 feet, for all types of communication services up to 3,000 megacycles. Services and facilities for any types beyond this frequency range are provided on a custom order basis.

Whether you need ruggedized mesh antenna for high wind load areas . . . or prefer an economical spun aluminum reflector for less critical service conditions . . . or perhaps our latest sectionalized plastic design for low-cost, long-distance bulk transportation . . . or even a *special* design to your specific needs, you can depend on Prodelin parabolic antennas . . . known and used throughout the world in a variety of service applications.





Prodelin is ready to serve you with confidence and experience . . . to recommend reliable service-proved antenna system equipment.

For Prodelin's Complete Line of Parabolic Antennas, Transmission Line, Support Structure, etc. or Information on Its Special Design and Manufacturing Facilities, Write:

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The people of General Telephone Company of Illinois are men with a lot of line work experience. Several of their trucks are now equipped with Tel-E-Lect diggers and derricks.

Tel-E-Lect derricks are simple to operate even by one man . . . self-storing for over-the road travel . . . ruggedly built for long life service . . . compact to conserve valuable truck storage space.

For years we've been telling telephone and power companies about our complete line of pole hole digging and pole setting equipment . . . "A" and "T" Frame Derricks for front or rear operation by either mechanical or hydraulic control . . . mechanical and hydraulic diggers . . . drive systems . . . and custom utility truck bodies. If you'd like more information and literature write:

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10007 MINNETONKA BLVD.
MINNEAPOLIS 26, MINN.

and Stewart Air Force Base, New York. The Air Training Command Headquarters at Scott Air Force Base, Illinois, has circuits to Lackland Air Force Base, Texas, and Keesler Air Force Base, Alabama.

The nets, described in the three paragraphs above, all make use of telephone lines. The Air Research and Development Command operates a network which makes use of telegraph lines, with consequent reduction in transmission speed as compared with telephone lines.

This network consists of three circuits emanating from the Command Headquarters at Baltimore, Maryland. The northern circuit goes to the Rome Air Development Center, Griffiss Air Force Base, New York, and to the Air Force Cambridge Center, Hanscom Field, Massachusetts. The southern circuit connects with the Armament Center, Eglin Air Force Base, Florida, and the Missile Test Center, Patrick Air Force Base, Florida. The western circuit includes the Air Development Center, Holloman Air Force Base, New Mexico; Air Force Special Weapons Center, Kirtland Air Force Base, New Mexico; and Air Flight Test Center, Edwards Air Force Base, California.

The foregoing is not intended to be a complete inventory of telephony and telegraphy usage by the military services, but is merely a representative listing. As an element of national defense, particularly in the air defense aspects, the telephone and telegraph systems are a national asset of increasing importance and incalculable value. These systems are also outstanding examples of what can be contributed by American free enterprise to the maintenance of national security.

Hamilton Firm to Handle Farm Fair Communications

The Allen K. Hamilton Consulting Engineers of Woodstock, Ill., has donated its general engineering services and has accepted the chairmanship of the Communication Committee for the first world's fair of farming and conservation, which will be staged in McHenry County, Ill., in September. The fair will be called Farmerama '57, Inc., and is a nonprofit corporation organized by leading civic and farm groups in Illinois, under the auspices of the Soil Conservation Districts of Illinois.

Farmerama '57 will be staged on 450 or more acres and will, for the first time, feature the unveiling of tomorrow's farming and conservation machinery. Over 100 equipment manufacturers will demonstrate machinery that is now in the laboratory or testing stage.

XUM

Columbia Sponsors Utility Management Workshop

The sixth utility management workshop sponsored by the department of industrial & management engineering of Columbia University will be held at Arden House, Harriman, N. Y., July 28 to Aug. 9, 1957.

The workshop, under the direction of Professor Robert Teviot Livingston, is designed specifically for the utility industries to meet the need for developing and extending management methods and concepts in the light of particular problem areas.

Over the past five years the workshop program has taken up such important problems as human relations, management development, and the total process of management in the modern utility.

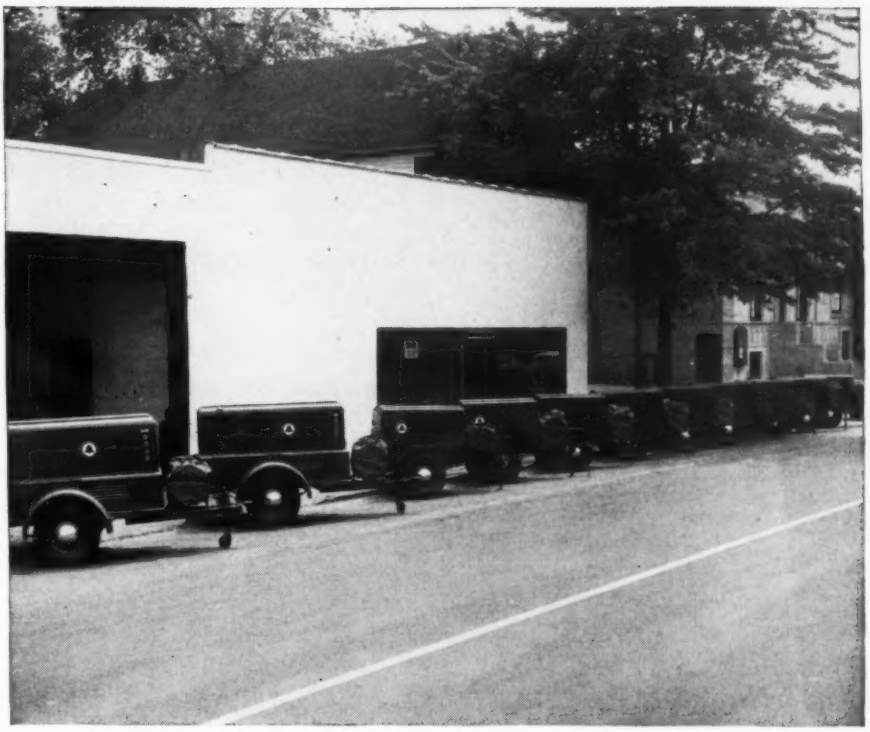
This year the workshop directs attention to the job of the manager and the problems of communication in management.

A special feature of the workshop will be a panel on human relations in management composed of social scientists who are experts in this field. The panel will be moderated by Dr. Lyman Bryson, well-known for his television and radio programs.

Intensive small group work and staff presentations and guidance are complemented by speakers who are specialists in the fields of management, decision-making, and communications.

Participation in the workshop is open to nominees from gas, electric, telephone and pipeline companies, airlines, railroads, and other transportation companies.

"I had to rush away from my cake baking, Alice—I wish I could show Tom how nice it would be to have a telephone right in the kitchen!"



Power insurance . . . on wheels, for the Michigan Bell System

This fleet of eleven trailer-mounted Onan Electric Plants was recently put into service by the Michigan Bell Telephone Company. Self-contained and highly mobile, these gasoline-powered generating units can be rushed to any exchange where an outage of commercial power occurs.

The new fleet consists of six 5KW, three 10KW and two 25KW Onan plants. All are remote starting units generating 115/230-volt, 60-cycle, single-phase current. Each is mounted on a high-speed, 2-wheel trailer with a weatherproof housing that encloses the built-in fuel tank, starting battery, engine-instrument and electric meter panels, and A.C. outlet receptacles. The drawbar supports an extension cord reel.

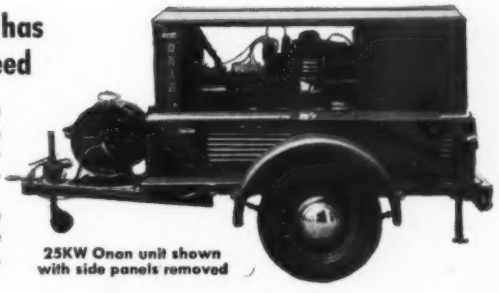
Within minutes after the electric plant arrives at the exchange, it is supplying power to keep telephone service operating.

The Michigan Bell System is one of many companies using Onan Emergency Electric Plants to help assure vital telephone communications at all times, under all conditions.

Trailer-mounted, or permanently installed, Onan has a standby plant for every need

Standby models are available from 1,000 to 75,000 watts. Air-cooled models up to 10,000 watts available with Vacu-Flo air-cooling for installation in areas where ventilation is a problem.

Onan also builds lightweight, portable plants for plug-in electricity on maintenance and construction jobs. 500 to 10,000 watts.



25KW Onan unit shown with side panels removed

See how other companies are using Onan Standby and Portable plants. **WRITE FOR FOLDER.**

Onan ELECTRIC PLANTS

D. W. ONAN & SONS INC.

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construction and maintenance DIGEST

- **Long-lived service**
- **On the inside**
- **Dependable ringing**
- **Pennies for power**

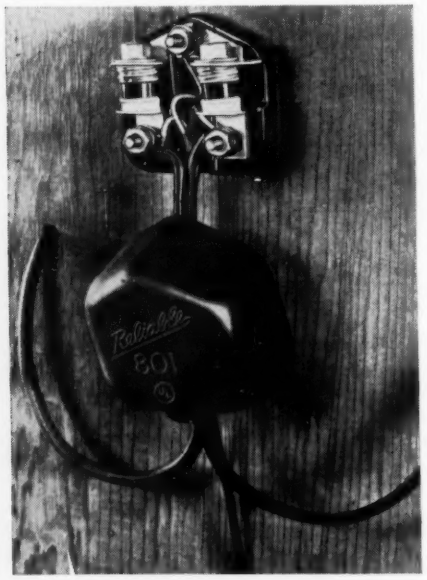
Published regularly to help you get the most out of your materials and supplies dollar

by Joseph W. Mullin, Inside Sales—Kansas City

My pet hobby is photography. Maybe you've noticed yourself—a double exposure can be mighty interesting. For instance, when you order supplies from Stromberg-Carlson you see **two** big benefits in the picture. One, you get fine products with a two-fold guarantee—ours and the maker's. The guarantee is backed by our 62-year reputation. And here's the other. Your support gives the science of telephony a push forward. As you know, this industry is a full-time job with us. Your supply orders help us continue research for new and better telephone equipment. So we say a heartfelt "thanks"—it's a pleasure to serve your supply needs.

Long life under all conditions

You get long service life under all kinds of weather conditions with the Series 800 Fuseless Protector, recently developed by Reliable Electric Company.



Easy to install and maintain

This new protector is available with Reliable No. 504 Protector Units (as No. 801) for station protection and with Reliable No. 506 Protector Units (as No. 801A) for cable protection.

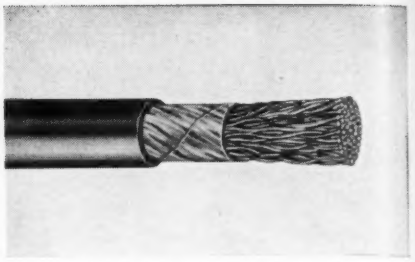
The weather-tight neoprene cover has passed the Underwriters Laboratories severe requirements for performance and weathering under temperature extremes. The protector is listed under **UL** Re-examination Service.

The neoprene cover fits snugly and drops out of the way conveniently when protector is installed or serviced.

Long life . . . low cost

To meet your needs for inside wiring cable, Whitney Blake Company offers Inside "Telecable"—multiconductor paired—with semi-rigid insulation—brown or ivory Plastite jacket. Available in 24 A.W.G. soft bare copper conductors up to 76 pairs and 22 A.W.G. up to 51 pairs.

This inside wiring cable gives long service life because: it is water-resistant; has high resistance to crushing; is unaffected by humidity. The semi-rigid Plastite insulation has far greater compression strength than regular polyvinyl chloride compounds. The resulting long life of the cable means much lower maintenance costs.



Semi-rigid Plastite insulation

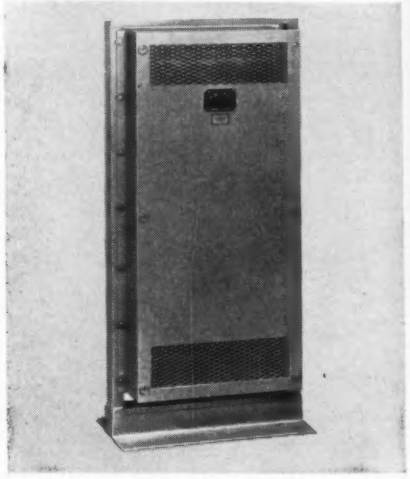
Inside "Telecable" is light in weight and easy to install. To terminate conductors, simply strip insulation and then solder.

The insulation is permanently colored for lasting polarity identification.

Your Stromberg-Carlson representative will gladly introduce you to the economy of this wire.

Easy way to generate synchromonic ringing frequencies

Here's a dependable, dollar-saving way to generate frequencies for synchromonic ringing systems—15, 20, 30, 42, 54 and 66 cycles.



Model S-5 can be equipped to supply either 15 or 20 cycles as the fifth frequency, in addition to 30, 42, 54 and 66 cycles.

With no moving parts, the Lorain S-5 Sub-Cycle needs no lubrication or maintenance attention, once installed.

It uses a unique conversion principle, combined with basic sub-cycle circuits, for producing the output frequencies you need. An important feature of this principle is that output frequencies are actually locked to AC line frequency, using a definite ratio. Thus you get precisely accurate ringing frequencies.

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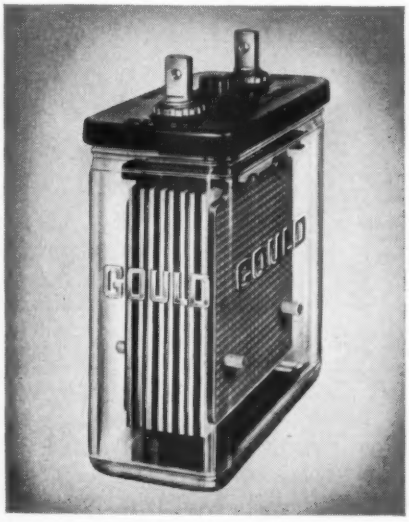
You also get exceptional voltage regulation on all five ringing frequencies. This is an important factor in the elimination of cross-ring in multi-frequency ringing systems. The output voltages are substantially independent of input voltage variations or load conditions on other ringing frequencies.

For maintenance-free, truly reliable conversion to synchromonic frequencies, ask your Stromberg-Carlson representative about the Lorain S-5 Sub-Cycle.

Battery has lowest yearly cost

There's an easy way to save money on switchgear, signal and alarm systems or emergency light and power applications.



Gould Planté rolls up excellent service records—cuts maintenance to a minimum.

Amazing service records have proved that Gould Planté batteries have the lowest yearly cost of any battery you can use. Pure lead positive plates help make this possible.

For top operating economy, ask your Stromberg-Carlson representative for Gould Planté—the Aristocrat of Stationary Batteries.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

Courts and Commissions

Wis. Judge Upholds Company Control of Directory Cover

A decision was handed down earlier in April by Judge B. F. Beilfuss of Neillsville, Wis., which recognizes the right of a telephone company to determine whether or not directory covers shall be permitted on its books.

A mortuary in Wisconsin Rapids ordered 400 such covers from an advertising agency in La Crosse with the understanding the agency would clear with the Wood County Telephone Co. for permission to attach them.

The advertising agency did not. When the agency attempted to collect for shipment, the mortuary refused to pay and the matter went before Judge Beilfuss.

His verdict recognized that permission of Wood County Telephone Co. to use the binders was required and, since it had not been received, the contract was void. The Wood County company's tariff forbids use of these covers.

Pass Tax Raise on to All Customers, SW Bell Asks

A complaint filed with the Arkansas Public Service Commission on April 11 by the Southwestern Bell Telephone Co. raised the question of whether municipal utility franchise tax increases should be passed to all of the company's customers or only to the customers in the city imposing the tax.

Noting that the city of Pine Bluff recently increased the company's franchise tax from $12,000 to $25,000, Southwestern Bell contended that its Pine Bluff customers should have to pay the extra cost. Otherwise, all of its other customers would have to help make this additional contribution to the operation of the Pine Bluff city government, it was pointed out.

Southwestern Bell's complaint said that when the commission fixed the company's rates in 1953, it allowed the company $182,000 as an operating expense for franchise taxes in all the Arkansas cities it serves. The commission made no allowance for increases in such taxes.

As a result, the company said, permitting this extra charge as an operating expense would mean forcing all of its customers to share in the tax levied for Pine Bluff alone. Arguing that this would discriminate against rate payers in other cities, the company contended that if Pine Bluff residents are going to get the benefit of city services financed by the higher tax, then they should pay for it.

The company wants the commission to allow it to add the cost of the higher franchise tax directly to the bills of Pine Bluff customers. It would amount to five or 10 cents on each residence telephone bill and 15 to 20 cents on a business telephone.

The Arkansas commission heretofore has set allowances for franchise taxes on a uniform basis, but some cities recently have been raising taxes on utilities much higher than these allowances.

Ask Permission to Sell Wyoming Independent

A hearing will be held on May 7 by the Wyoming Public Service Commission on proposed sale of O. Lowe & Son Telephone Co., Afton.

Heirs of Osborne Lowe—Osborne Lowe Jr., Mrs. Wanda Staley and Mrs. Nora Roberts—petitioned to sell the company to Mrs. Staley and her husband, Warren, of Jackson. The company owns a toll line linking Afton, Thayne, Bedford, Alpine and Freedom.

Indiana Company Gains Raise

A rate increase for the Sullivan Telephone Co. has been authorized by the Indiana Public Service Commission, it was reported on April 2 (TELEPHONY, Feb. 23, p. 59). The increase, the first in 43 years, amounts to about 45 per cent over-all.

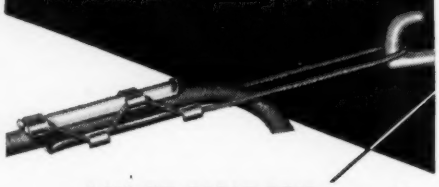
Raise Neb. Paystation Rate

The Nebraska Railway Commission on Mar. 26 approved an increase from five to 10 cents per local call from public paystations for the Hamilton County Telephone Co., Aurora, Neb. The rate applies to nine exchanges served by the company.

Seeks to Incorporate

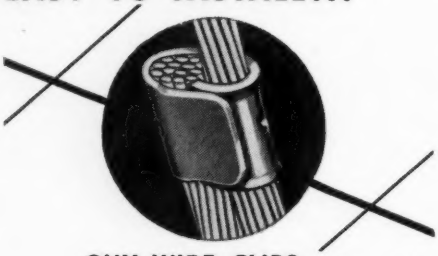
The Kearney County Dial Telephone Co., Hildreth, Neb., on April 17 filed articles of incorporation with the Nebraska Secretary of State. Incorporators are Donald Knaus, George Rah-

KEARNEY
Time-Savers



LAY-CIT CABLE GRIP for multi-conductor drop wire cables... non-slip double gripping action.

EASY TO INSTALL...

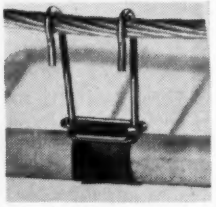


GUY WIRE CLIPS serve up strand ends neatly, quickly... with a single, simple squeeze.

SAVE MAINTENANCE...

HOUSE AND POLE HOOKS ... pull-proven for long-holding service ... hot-dip galvanized.

...FOR YEARS TO COME



CABLE HANGER... neoprene-impregnated glass-fibre strap cannot deteriorate ... holds secure without damaging insulation.

For Better Construction... Safer Maintenance

Specify

272

KEARNEY PRODUCTS

JAMES R. KEARNEY CORP., 4224-42 Clayton Ave., St. Louis 10, Mo. • *Canadian Plant:* Guelph, Ontario

mann, Harvey Stuehm, Louis Frecks and Henry Frecks.

Suspends NE T&T Raise In New Hampshire

The New Hampshire Public Utilities Commission on April 16 suspended the effective date of a $1,464,000 increase in telephone rates being sought by the New England Telephone & Telegraph Co.

Meanwhile, Governor Dwinell asked the New Hampsire legislature to appropriate $50,000 to hire special counsel to investigate the requested raise in rates.

In another related development, Deputy State Attorney General Warren E. Waters said he planned to check the company's accounting procedures to determine if there are any federal income tax savings that could be passed on to customers.

The company had proposed that the new rates be put into effect on June 1, but the commission suspended the date pending the outcome of public hearings not yet scheduled.

Asks to Discontinue

The Kansas Corporation Commission on April 30 was to hear the application of the Irving Telephone Co. for authority to cease business, it was reported.

Minnesota Companies to Buy

The Minnesota Railroad & Warehouse Commission on April 5 authorized the New London Telephone Co. to purchase the Norway Lake Telephone Co. of New London; also on April 11 the Clear Valley Telephone Co. to purchase the Lakedale Telephone Co.

Mo. Company Asks to Sell

The Missouri Public Service Commission on April 15 received the petition of Western Light & Telephone Co., Inc., to sell its exchange at Gainesville to Modern Telephone Co., Inc.

Rate Investigation in Mass.

Governor Furcolo on April 8 signed into Massachusetts law a bill appropriating $100,000 to investigate the New England Telephone & Telegraph Co.'s request for an 18.5-million-dollar rate increase (TELEPHONY, Mar. 9, p. 44).

Authorize Missouri Raise

The Missouri Public Service Commission on April 17 authorized the Pleasanton (Kan.) Telephone Co. to increase rates at its Hume, Mo., and Foster, Mo., exchanges.

Oregon Company Authorized A 4.57 Per Cent Return

On April 18, Oregon Public Utility Commissioner Howard Morgan approved a $571.20 gross revenue increase for the Haines Telephone Co. (TELEPHONY, Mar. 30, p. 44).

With the new rates in effect, the commissioner estimates the company will experience a 4.57 per cent rate of return on its average net plant and working capital, which totals $17,067.67. The return on this figure as of Dec. 31, 1956, was 1.22 per cent.

Okla. Relocation Bill Goes To Governor; Kansas Vetoes

In Oklahoma, a bill to permit reimbursement of public utilities for the cost of relocating their facilities when necessitated by interstate highway construction, was given final passage by the legislature on April 8, and went to the governor for signature.

A bill in Kansas which would have required the state highway commission to pay the highway facilities relocating costs was vetoed by Governor Docking on April 11.

U. S. Fire Losses in March Total $104,565,000

Estimated fire losses in the United States during March amounted to $104,565,000, the National Board of Fire Underwriters (NBFU) has reported.

According to Lewis A. Vincent, NBFU's general manager, this $104,565,000 loss represents an increase of 17.1 per cent over losses of $89,315,000 reported for March 1956, and an increase of 9.4 per cent from losses of $95,569,000 for February 1957.

Losses for the first three months of 1957 now total $315,406,000, an increase of 16.7 per cent over the first three months of 1956, when they amounted to $270,328,000.

These estimated losses include an allowance for uninsured and unreported losses.

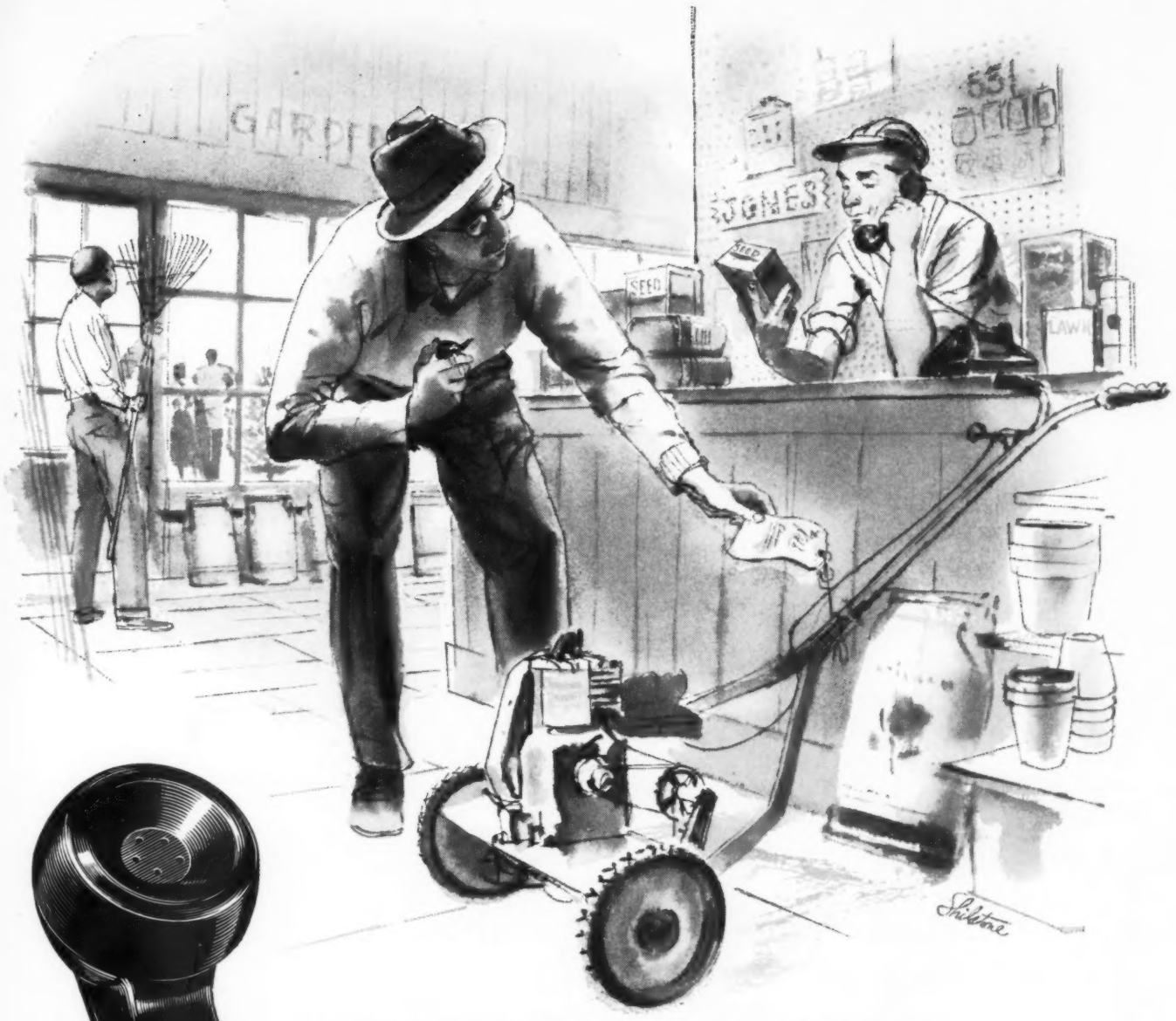
Mo. Company Asks to Buy

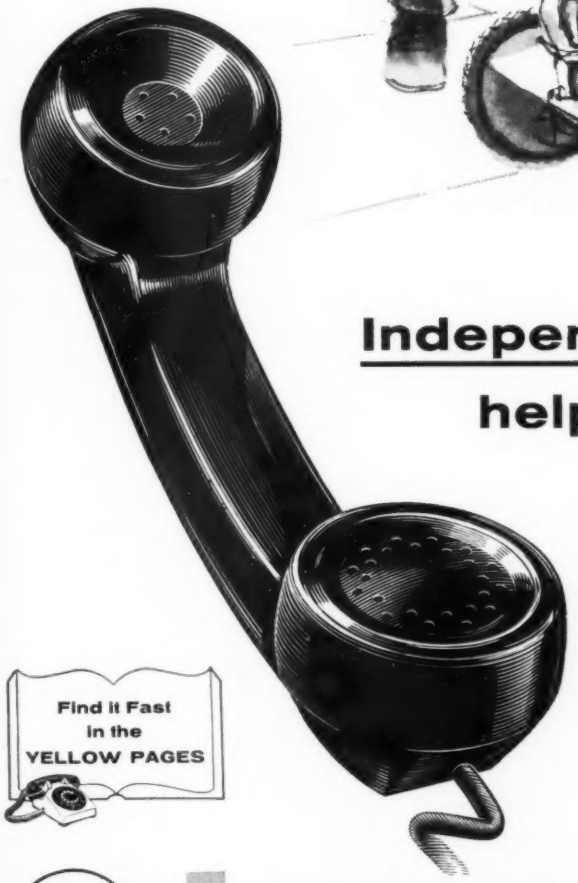
The Missouri Public Service Commission on April 12 received the application of the Verona Telephone Co. to purchase the Stotts City Telephone Co.

An Ultimate Authority

"Under a free economic system, the consumer remains the ultimate authority as to what will and will not be produced. If the businessman fails to do his duty by the consumer, he eventually has no duty to perform."—EDITORIAL STATEMENT, *The Wall Street Journal.*

XUM





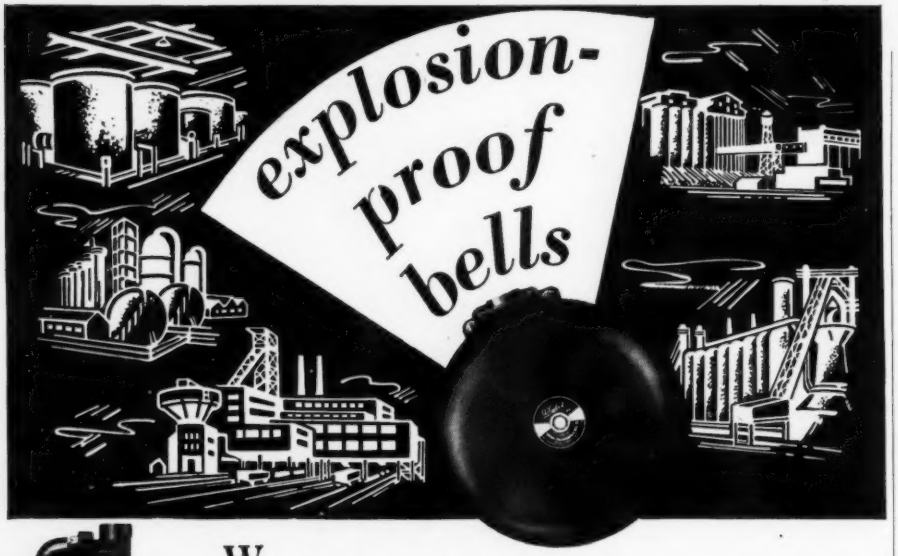
Independent telephones help you reach all America

Springtime—buying time. Shopping this weekend? Power mower . . . grass seed . . . a new set of golf clubs . . . whatever you're after, you can locate dealers and brands *before* you start out. In the yellow pages of your telephone directory. From Maine to California, smart buyers and businessmen depend on the yellow pages . . . just as they depend on the nine million Independent telephones that serve *two-thirds of the entire area of the nation.*

INDEPENDENT

INDEPENDENT TELEPHONE COMPANIES of America United States Independent Telephone Association • Pennsylvania Building • Washington, D.C.

This 35th USITA national ad appeared in April 15 Time and April 26 U. S. News and World Report



Side view of the Signal Explosion-proof Bell

When hazardous conditions demand explosion-proof electrical equipment, be sure to include **Wheelock Signals' Explosion-proof, Contactless Vibrating Bell.**

All current-carrying elements are enclosed in a rugged housing and all mechanical parts are fully protected against atmospheric corrosion.

Wheelock Signals' Explosion-proof Bell, built by the originators of Underdome Bells, has been proved in service and is listed by Underwriters' Laboratories, Inc. for the following:

Class I, Groups B, C and D Class II, Groups F and G.

Write for Bulletin EPI-4

SOLD THROUGH ELECTRICAL WHOLESALERS

Signal Engineering & Mfg. Co. has changed its name to
Wheelock SIGNALS
SIGNALS W S LONG BRANCH, N. J.

APPROVED MODELS FOR ALL 4 W.Ds. TO 1½ TONS

WARN MFG. CO.

Stop Front Drive Wear in 2-Wheel Drive

Warn Hubs on your 4 w.d. will reduce front drive wear *in exact proportion to the miles you drive in 2 w.d.!* Watch your mileage, and you will find that you use 2 w.d. *most of the time.* With Warn Hubs, the front drive is "idle" in 2 w.d.—nothing turns but the wheels. There is no wear, no drag, no front gear whine. Your 4 w.d. has more pep, speed and power in high, and steers easier.

For maximum convenience, install Warn Lock-O-matics. They *automatically* engage the front wheels for 4-wheel drive, and disengage them for free-wheeling 2-wheel drive, *as you shift!* Warn Locking Hubs have easy fingertip controls. With either model, you'll get better, more economical service from your 4 w.d. See your local 4 w.d. dealer today. Free literature.

RIVERTON BOX 6064-TY5
SEATTLE 88, WASHINGTON

TYPOGRAPHICAL PLAN

Continued from page 20

the two through bolts. This brace is also equipped with two guying grommets of durable insulating material that also serve as shims between the pole and the pipe section. The top grommet is located directly under the crossarm which permits side guying directly to the load on the arm and its insulating material prevents grounding of the pole line hardware. Additional guys may be placed on the second grommet located on the bottom through bolt.

The crossarms may be ordered bored with 11/16-inch holes that provide variable spacing of the wire at 8 inches, 12 inches, 16 inches and 24 inches. This combination permits side arming up to 24 inches without additional bracing, other than the above described support assembly.

All wire under the "Topo" plan is placed at the recommended tensions of the wire manufacturer. A dynamometer calibrated to at least 1,000 pounds and roller bearing eveners are imperative tools to the proper placement of wire on this plan (see *Fig. 3*). These tools insure proper and identical tension to both wires of the circuit which is of utmost importance.

The value of the wire equalizers is that both wires are of identical tensions, therefore, shorts in open wire are virtually an impossibility if caution is used in stringing operations. We have tried unsuccessfully to short-out these circuits by pulling the wire down at the transposing plate locations and twisting the circuit several times, then releasing it to its normal position, but within seconds the circuit clears itself of the short. This is attributable to two conditions; first, the identical tensions of both wires of the circuit, and, secondly, the wider separation of the wire at the points of support, as compared to the 8-inch separation of the wire at the transposition plates. We have purposely dropped trees, limbs, and old poles with crossarms attached, in an effort to simulate a natural attack on these new lines and we have yet to experience the first short, cross, open, or the first case of trouble on our new lines.

This report is made from our experience with this type of plant which we built in 1956. At this writing we have started our 1957 construction program on the "Topo" plan in spite of deep frost conditions, because the economies that we have experienced more than compensate for the additional costs encountered in winter and early spring construction activities.

Previous to the sleet loading on our

XUM

Line Service. Wherever there's trouble—wherever line repair crews and their equipment are needed—the extra traction of the Universal 'Jeep's'† 4-Wheel-Drive gets them through—in good weather or bad. The 'Jeep' travels on or off the road to take tools, equipment and men wherever the line leads.

Ten billion miles of proof!*

One of the reasons 'Jeep' vehicles assure uninterrupted customer service

The completely new Forward Control 'Jeep' FC-150 Truck. It's the first time a 4-wheel drive truck has so effectively combined so much cargo capacity (74-inch pickup box), with such exceptional "go-anywhere" maneuverability (81-inch wheelbase).

Maintenance. The 4-Wheel-Drive Universal 'Jeep' tows heavily-loaded service trailers to maintenance jobs in the city or over rough country terrain. With its all-wheel traction and low gear range, it has a drawbar pull of more than a ton.

†*Model CJ-5 shown.*

**An understated estimate of the miles of transport service driven by 'Jeep' family vehicles. Some estimates place the mileage at more than fifty billion.*

Because 4-Wheel-Drive 'Jeep' vehicles are the only vehicles in their weight class time-tested and performance-proved in 10 billion miles* of on-the-job transport service... they're depended on more and more to help maintain 'round-the-clock telephone service.

These "go-anywhere" vehicles work for you every day of the year—assure uninterrupted customer service—in good weather or bad. They travel the highway at top legal speeds in conventional 2-wheel drive. But when storms or other emergencies threaten service, the extra traction of their 4-wheel drive takes them through mud, sand, soft earth, or up steep 65% grades. With power take-off or hydraulic lift, 'Jeep' vehicles supply mobile power to operate many types of equipment from sprayers for weed control, to trenchers, post-hole diggers or winches.

Let your Willys dealer show you how 4-Wheel-Drive 'Jeep' vehicles spread their costs over many jobs... provide additional savings through long life, low upkeep and high resale value. Ask for a demonstration or write for specifications.

The 'Jeep' family of 4-Wheel-Drive vehicles

WILLYS... makers of time-tested utility vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

Light-Weight Aluminum Castings

make the Coffing Aluminum Super Power the lightest hoist in its class

Coffing Super Power hoists are available with aluminum castings which reduce their weight without sacrificing strength. Both 1½ and 3 ton models are more than 20% lighter than any other hoists in their class.

Super Powers, which also are available in malleable iron in capacities from 1½ to 5 tons, have sealed-in lubrication for moving parts and require a minimum of maintenance. Overload testing, "Safety Valve" handles, and constant load-locking ratchet-and-pawl assure safe operation. For complete details, consult your Coffing distributor or write to us for Bulletin L-3. **Coffing Hoist Division, Duff-Norton Company, 808 Walter Street, Danville, Ill.**

Red Jet WEED CONTROL BURNER

The BEST and CHEAPEST way to control weeds and insects . . .

USES LIQUID L. P. GAS—
The Most Economical Burner Yet Designed.

- Uses Full Tank Pressure.
- Throws Flame 8 to 12 Feet.
- Flame Temperature 2500 Degrees Plus.
- Burns 12 to 25 Gallons Per Hour.

The RED JET Has Many ADVANTAGES.

- Kills All Annual Weeds.
- Kills Insects— Destroys Their Eggs.
- Prevents Reseeding.
- Decreases Labor Cost.

RED JET is the product of four years' experience in manufacturing weed control burners for use with liquefied petroleum gas. Prices and specifications sent promptly. WRITE TODAY.

NORTHWEST FABRICATORS • NYSSA, OREGON

new lines, early this year, we were not fully aware of the strength and stretch characteristics of the highest tensile wires made available to us by the wire manufacturers. Neither did we realize that these inherent values of the wire could become so extendable, when set within a new framework of revised plant practices, that losses of aerial plant to the elements of nature become optional.

We will be very glad to answer any inquiries that the readers of this article may wish to extend our way.

REA Makes New Telephone Loan Security Requirements

New requirements for telephone loans made by the Rural Electrification Administration were announced on April 19 by the U. S. Department of Agriculture.

Designed to strengthen the government's security for such loans while giving impetus to the rural telephone program, the new minimum requirements are effective at once and will be applied, where practicable, to loans in process.

While greater security for loans is provided in the new policy, less delay on the part of some borrowers in meeting their initial requirements is anticipated.

"In many instances this will advance start of construction and thus expedite our efforts to get more and better telephone service to farmers," said REA Administrator David A. Hamil. He added that the new policy "reflects experience gained by REA and its borrowers in the conduct of the program and is a direct result of our continuing search for ways to improve our policies and procedures."

In determining that there is adequate security for loans to all types of telephone borrowers, REA will be guided by five factors or requirements:

(1) A reasonable assurance of obtaining the telephone market on which the proposed system design is based.

(2) A finding that the proposed system is economically feasible with application of rate schedules that are appropriate for the area to be served.

(3) A determination that the experience, community standing, and general reputation of the principal owners and manager of the borrower are satisfactory.

(4) A first lien on the borrower's total system or other adequate security.

(5) The acceptance of specified managerial and financial controls in the loan security documents to be effective when the REA minimum net worth requirement is not being met.

The policy provides that REA stress the first three of these factors in de-

termining loan security. The agency believes these are essential to the continued successful operation of the borrowers' telephone systems.

Said Administrator Hamil:

"Fundamental to loan security is the telephone market because it provides the revenue needed to meet the obligations of the borrower.

"Another essential factor in loan feasibility is the ability of subscribers to pay rates which will cover the borrower's expenses and permit it to make payments on loans when due.

"In addition to feasibility, we believe it necessary to give attention to the quality of borrower management and its acceptance of the primary purpose of the telephone amendment to the Rural Electrification Act—the furnishing of good telephone service to the largest practicable number of rural people."

In the new policy statement REA strongly recommends, as a sound management practice, that borrowers build up a net worth adequate to assure a strong financial structure. It recommends that borrowers set a net worth goal considerably higher than the minimum loan security requirements stipulated in the mortgage.

All mortgages under the new policy will prohibit payments of dividends (other than on preferred stock issues, the terms of which have been approved by REA) or other distributions of net worth when the net worth, after the distribution, falls below 10 per cent of the net assets as defined in the mortgage.

Whenever net worth is below 10 per cent REA may exercise certain managerial controls over salaries and fees. In addition, REA may appoint a supervisor for non-profit organizations whenever the borrower is in default for 30 days or more on any loan payment.

Non-profit borrowers, such as cooperatives, limited dividend or mutual organizations, must satisfy REA that they have signed up for service at least 70 per cent of the total number of subscribers estimated in the loan application. They must also collect at least $10 from each unserved signed applicant.

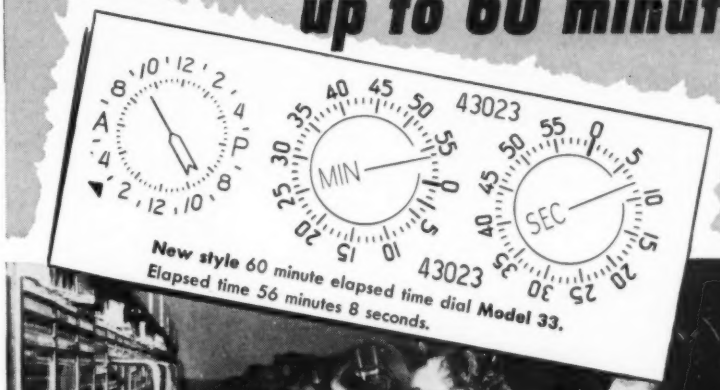
For loan applications involving acquisition of existing telephone facilities at a price in excess of the REA appraisal, both types of borrowers will normally be required to provide new equity funds to cover the amount over the appraisal.

The policy further provides that the administrator may require borrowers to obtain equity funds whenever essential to loan security.

The new loan security policy is spelled out in REA Bulletin 321-2,

CALCULAGRAPH

Now Automatically gives you accurate Toll Call Records— up to 60 minutes



New style 60 minute elapsed time dial Model 33.
Elapsed time 56 minutes 8 seconds.

Photo courtesy of Union Telephone Co., Owosso, Mich.

Now, Calculagraph, the modern dependable computer, automatically figures and prints toll calls up to 60 minutes —no need to add 30 minutes on long conversations.

Thus, Calculagraph adds one more feature to reduce human errors by busy operators and increases the volume of calls handled per operator. Assures you of all revenue due on every call.

For accurate toll call records, for automatic computation of elapsed time, for more efficient operation, install the new 60-minute elapsed time Calculagraph on your switchboard.

Information on this new Calculagraph is yours upon request.

Write today for illustrated brochure to Dept. T.

CALCULAGRAPH Company
HARRISON, N. J.

DEPENDABLE ELAPSED TIME COMPUTERS SINCE 1892

TAKE A BIG STEP TOWARD SAFETY WITH DUO-SAFETY LADDERS

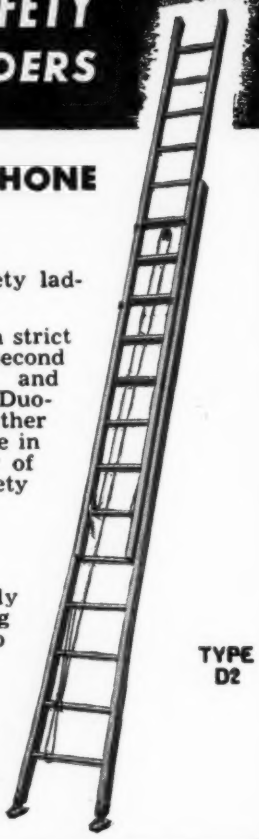
... CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

"YANKEE" TOOLS for Telephone Service

SERVICE IS THEIR BUSINESS, TOO!

No. 2150 Bit Extension —bits will not loosen or jam in socket. Takes large range of bits. Chromium plated.

No. 2101 Bit Brace— with smooth, positive ratchet action, quick-centering ball bearing chuck and patented sweep action (no play or binding), unbreakable hard rubber handles.

No. 130A Spiral Driver —the driver that *turns* while you *push*. Easy to operate, powerful, it tightens or loosens screws and small nuts quickly and easily.

No. 41 Push Drill ("100 PLUS") all-metal, highly finished. Magazine handle holds eight drills, from 1/16" to 11/64".

In the enviable reputation for good service that the telephone companies have earned, the contribution made by linemen and maintenance men is outstanding. And we at "YANKEE" are proud of the part "YANKEE" TOOLS have played in this achievement. For over 50 years "YANKEE" TOOLS have been "standard equipment" with service men. And every year more and more go into telephone service.

THE TOOL BOX OF THE WORLD

STANLEY

YANKEE TOOLS
Subsidiary of
The Stanley Works
Philadelphia 33, Pa.

available from Rural Electrification Administration, U. S. Department of Agriculture, Washington 25, D. C.

Obituaries

GUY O. SEATON, 70, Lincoln, Neb., died April 16. He had been associated with The Lincoln Telephone & Telegraph Co. since 1926 when he joined the company as manager of the securities department. He became director of personnel in 1943 and retired in 1952.

Mr. Seaton, before entering the telephone business, had been identified with banking interests in Missouri, Kansas, and Nebraska for some 24 years. In 1914 he organized and was executive manager and cashier of the Citizens State Bank at Superior. He later joined the Stock Yards National Bank at Kansas City as vice president.

He was a past president of the Frank H. Woods Chapter of the Independent Telephone Pioneer Association.

Mr. Seaton is survived by his wife, Nelle, and a son in California. He was also a relative of Secretary of the Interior, Fred Seaton.

•

W. H. SPURLOCK, 67, retired veteran installer and repairman of The Lincoln (Neb.) Telephone & Telegraph Co., died at Lincoln on April 14.

He began his telephone career at Ashland as a "troubleman" in 1916 shortly after the company purchased the exchange which was being served by both Bell and Independent companies, and later served as manager at Raymond for 16 years before moving to Lincoln as a combinationman in 1933.

Mr. Spurlock was a member of the Frank H. Woods chapter of the Independent Telephone Pioneer Association.

Engineering Lack

"We have a heart-breaking decrease in our young men and women willing to enter our universities and face the rigors of engineering and scientific training. Other nations today are outstripping us, and unless we find a remedy we shall have a decline in industrial progress and public improvements."—HERBERT HOOVER, *former President of the United States.*

The Open Hand

"Americans can never be accused of lacking in charity. The American Association of Fund Raising Counsel estimates that their giving in 1956 totaled at least 6.1 billion dollars, an increase of 10 per cent over 1955. That's the kind of people we have in this 'capitalistic', 'imperialistic', 'money-grubbing' nation." — Bellingham (Wash.) *Herald.*

XUM

The Fallacy of the Free Government Gift

Reader's Digest has printed an article, prepared by the American Economic Foundation, on a number of widely held economic fallacies. The article held, in part, that:

"One fallacy is that 'government has something to give the people which it does not first have to take away from them.'

"The truth: 'Government is never a source of goods. Everything is produced by the people, and everything that government gives the people it must first take from the people. Government benefits are raised through taxes. . . .'

"Another fallacy is that '. . . the workers of any nation can improve their welfare by increasing their pay without increasing their production.'

"The truth: 'Because wages are the principal cost of everything, wage increases (without corresponding increases in production) simply increase prices and do not improve the welfare of the worker.'

"Still another fallacy is that 'the owners of industry get the lion's share of the product and the workers get only the crumbs.'

"The truth: 'The amount of the product of all industry that goes to the workers is about 90 per cent. The amount that accrues to the owners of the tools (investors) is about 10 per cent. Yet the tools do more than 95 per cent of the work.'

"The source of all wealth and material welfare is production. The main reason the general standard of living now is so superior to that of the past is that science and invention, backed by the investment of huge sums of capital, have made it possible for each worker to turn out much more in the way of goods and services. If productivity continues to increase, living standards will continue to rise. There is no other way. It would be good if the great labor unions took the trouble to explain this basic economic principle to their members."

Taxation Needs Restraint

"Reasonable taxation is of course an essential of government, but when taxation is used as a social regulator it becomes a menace to freedom. . . . Its excessive application can reduce free men to serfdom, can destroy initiative, absorb the capitalistic system, and level representative government to Sovietism."—DOUGLAS MACARTHUR, *chairman of the board, Sperry Rand Corp.*

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Joe- Lets try the new small tip iron with plug- in 12 volt transformer. Looks like a natural for those tight spots! Chuck

American Beauty
T-12
TRANSFORMER TYPE ELECTRIC SOLDERING IRON FOR PRECISION SOLDERING

T-12 has its own 12-volt transformer that plugs into any 110-volt outlet. Quick, ample heat at the tip of this ultra-slim, pencil type iron for dependable, precision soldering on delicate or miniature electrical components. Super-flexible,7-foot cord. Cool, comfortable handle, made of high-impact thermo-setting material. One-piece tip-elements—1/16", 1/8" and 1/4" tip diameters—interchangeable, made of stainless steel and Armco ingot iron, permanently tinned. 17 or 20 watts input.

Low voltage means extra long tip-element life and complete safety. Model T-12 will give a lifetime of service.

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ABC OF THE TELEPHONE

Concluded from page 48

wrench type, no-wrench type, and swamp or marsh screw anchor, is the size of the anchor rod. As an example, the rod size of the 10-inch anchor in each of the three models is as follows:

10-inch Screw Anchor	*Size of rod or pipe*
Wrench	¾ inch rod
No-wrench	1¼ inch rod
Swamp	1½ inch pipe

A larger rod is provided on the no-wrench type because the anchor is subjected to a heavy torque when it is driven by an earth boring machine. Sections of pipe are used on a swamp screw anchor to facilitate increasing the length of the anchor rod when the anchor is driven deep into a swampy area. As a general rule, a swamp anchor is driven 8 feet to 10 feet into the plastic clay usually found under the mushy silt or quicksand near the surface of a swamp or marsh.

The size of the anchor rod also has a bearing on the size of the shank and, consequently, on the size of the point of the anchor. A slight difference in the flight of the anchor screw will be noted in comparing the three anchors. A swamp anchor has a greater pitch to the blade to help it bore into the soft, mushy soil. A shallower pitch would not pull the anchor into the ground as fast as is possible with the sharper pitch of the blade. If the swamp anchor has too shallow a pitch to the blade there is the possibility of developing a churning action in this extremely fluid type of soil which would hamper proper placement of the anchor.

The wrench type and no-wrench type anchors are used in Class 4, 5, 6, and 7 soil. Swamp screw anchors are used in Class 8 soil.

(To be continued)

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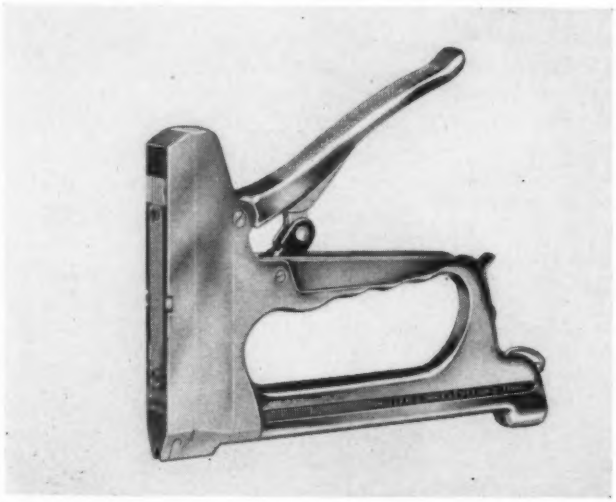
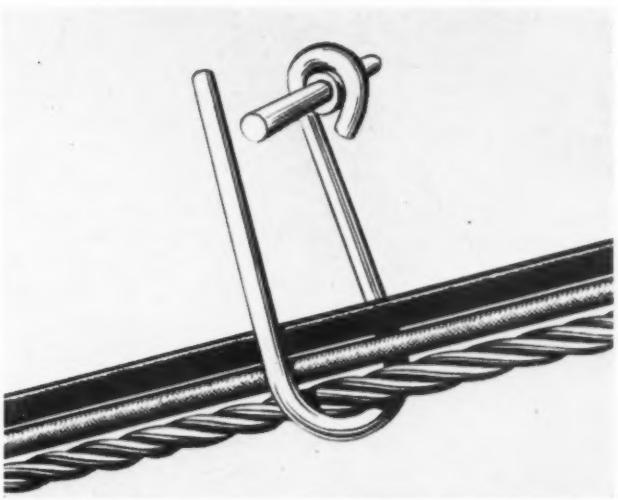


The Heller TM-1 Wire Stapler shown here is approved and in wide use by the Bell Telephone System. It is the latest addition to the famous Heller line of 300 staplers, tackers, nailers and stitchers. The TM-1 is a quality product throughout. Its barbed clinch staple blends with brown or ivory jacketed wire; locks itself firmly in place. Window port warns when staples are low. Send for literature.

Fasform Drive Rings



Fasform Drive Rings save an enormous amount of time and labor. Just drive in the nail (at any angle), slip in the wires, and you have a neat permanent fastening for all low voltage wires. Made of heavily galvanized high tensile steel wire in four sizes—½", ⅝", ⅞" and 1¼", supporting respectively 50, 75, 100 and 125 lbs. Fasform Division, The Heller Corporation. Send for literature.

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General of Cal. Steps Up Management Training

Finding the right niche for young employes (not over 35) with talent and managerial potential is a primary aim these days, the General Telephone Co. of California stated recently.

This company has launched an "all out" campaign to recruit men from within the company as well as outstanding graduates from leading colleges who show promise for placement in its management trainee program. Currently there are 23 such men taking advantage of this opportunity.

Employes selected for the program are called staff assistants during their course of training which lasts for 18 months. During that time they receive actual on-the-job experience in the company's division operating departments as well as the main general office departments in Santa Monica. In this way they receive a practical telephone education in each major field of activity as well as a broad viewpoint of operations, an important requirement in managerial training.

During the initial phase of the program, the staff assistants receive their field training in the company's western division, which includes Lancaster, Redondo Beach, Santa Monica and West Los Angeles. There, they must satisfactorily complete three months in the plant department, three months in engineering, six weeks in equipment and four months in the commercial department.

The final phase of the program is administered in the company's general office in Santa Monica, consisting of six weeks in each of the traffic, plant, engineering and commercial departments.

Upon successful completion of the program, the staff assistants are assigned to regular management positions alongside other members of the management team.

Because of the unusual demands placed upon the staff assistant, qualifications for selection are quite high. Those candidates under consideration meet the following requirements:

(1) A transcript of academic work completed shall be submitted by college graduates, and for non-college graduates performance on the job reflecting high quantity and quality of work shall be expected.

(2) The candidate would be observed during his visit to the company for attitudes and personal-social characteristics that would lend themselves to sound management behavior.

(3) Projective tests, and extremely comprehensive interviewing will be administered to each candidate, to insure that he possesses marked managerial potential and is of high caliber. Only those of this nature will be referred for selection.

Receiving instruction in how to complete a long distance call, as part of General Telephone Co. of California's management trainee program, is Donald Woods. Instructing is Amy Lauritson, West Los Angeles traffic department chief operator.

(4) After thorough screening by the general office industrial relations department, final selection of trainees will be made by a representative of the operating departments as designated by the operating vice president, or the appropriate staff department head, and a representative of the general office industrial relations department.

(5) The management trainee review committee, comprised of operating department heads and the industrial relations director, will be responsible for the periodic review, training disposition and final disposition of each trainee.

This committee is to be augmented by the appropriate staff department head when necessary.

The committee will meet at regularly scheduled quarterly meetings.

If a trainee is adjudged to be unsuccessful in the program, he may be asked to resign from the company with the assurance of an appropriate recommendation to future employers.

General of California states it is anxious to see its aspiring young employes take full advantage of the management trainee program since it is largely from this source that the company will draw its leaders of tomorrow.

Employes Want to Know

"Employes appreciate being told directly by management what the company's goals are. Simply give employes the facts on why things need to be done a certain way to make the enterprise successful and you will find cooperation is noticeably improved." — WILLARD V. MERRIHUE, *personnel practices and community relations service, General Electric Co.*

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For cables 1" Dia. and smaller

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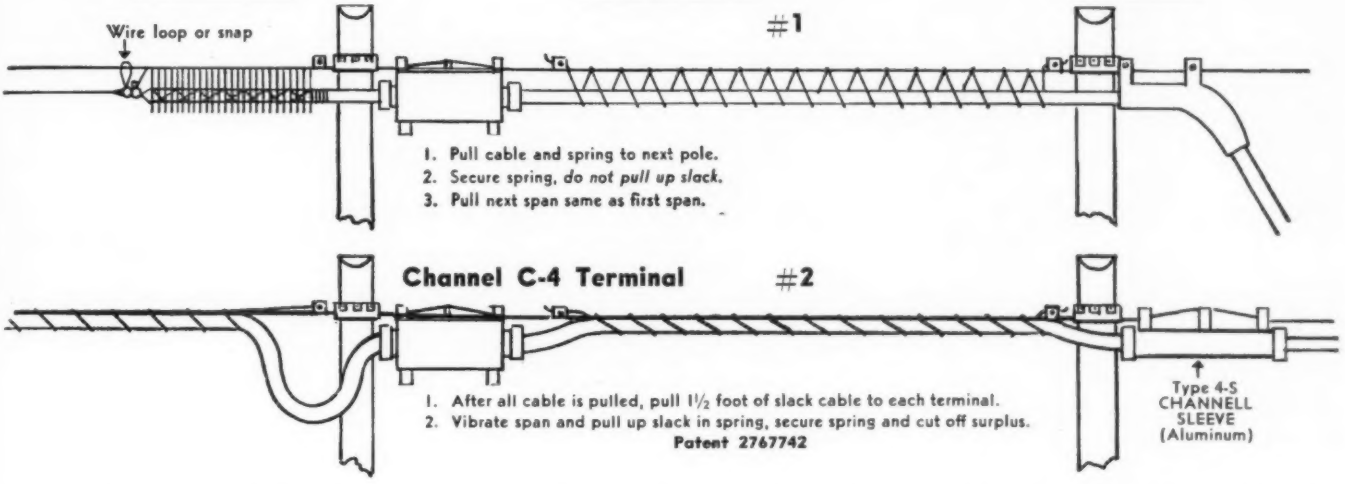
Wire loop or snap
#1
1. Pull cable and spring to next pole.
2. Secure spring, do not pull up slack.
3. Pull next span same as first span.
Channel C-4 Terminal
#2
1. After all cable is pulled, pull 1½ foot of slack cable to each terminal.
2. Vibrate span and pull up slack in spring, secure spring and cut off surplus.
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Type 4-S CHANNELL SLEEVE (Aluminum)

The springs are made in 21 inch lengths for 300 foot spans and can be cut to length on the job, 7 inches for 100 foot span. Springs may be spliced, when required.

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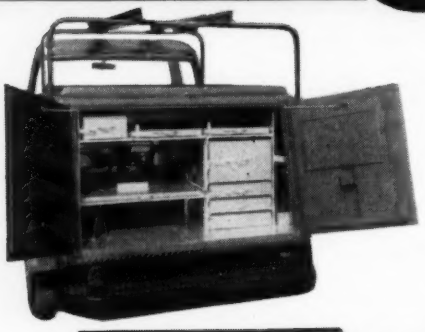

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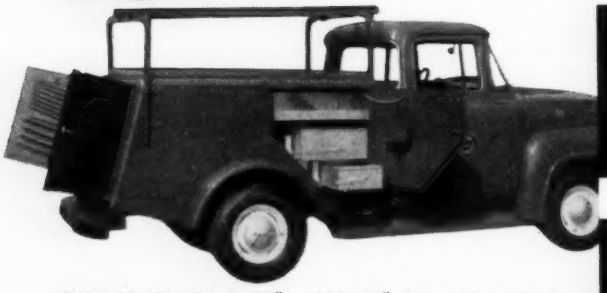
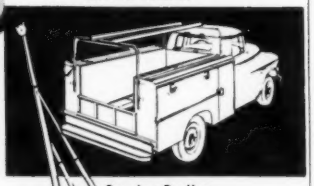


Personnel Carrier Service Bodies



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Tests Motor-Scooter for Downtown Areas in Mich.

The Michigan Bell Telephone Co. has come up with a unique three-wheeled vehicle as the answer to the problem of servicing thousands of business telephones in downtown areas without overloading a repairman with equipment or tying up traffic with a large truck.

The gasoline-powered unit is slightly larger than a motorcycle and provides space for repair equipment in a miniature truck bed at the back. (The cover photo shows a Michigan Bell repairman, Floyd Schaab, displaying the storage area.)

It can park almost anywhere without interfering with other traffic and still has room for carrying nearly all the tools and material needed by a repairman.

Painted a brilliant orange, it has a blue canvas shield in front and can be seen easily by other motorists.

Michigan Bell still considers the vehicles experimental. The company has two in operation now—one in Grand Rapids, the other in Lansing.

The "motor-scooter" in Lansing is used exclusively for servicing telephone and teletype facilities at the Oldsmobile plant.

In the Grand Rapids experiment, use of the vehicle was coordinated with police officials before it was placed in service.

Book Review

"MODERN MATHEMATICS FOR THE ENGINEER," edited by Edwin F. Beckenbach. University of California Engineering Extension Series. 514 pages. $7.50.

The book—termed a "must" for the modern engineer by the publisher—is divided into three parts:

The first, entitled "Mathematical Models," dwells successively on physical problems expressed in terms of ordinary differential equations, integral equations, and partial differential equations.

Next, in "Probabilistic Problems" are chapters bearing on the programming and operational aspects of engineering and on the use of probabilistic methods in solving problems.

Finally, in "Computational Considerations" the emphasis is frankly on numerical solutions; the concluding chapter deals with aspects of high-speed computing devices.

Contributing authors include:

Royal Weller, chief scientist, Naval

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Air Missile Test Center, Point Mugu, Cal.

Solomon Lofschetz, emeritus professor of mathematics, Princeton University.

Richard Bellman, mathematician, The RAND Corp.

John W. Green, professor of mathematics, University of California, Los Angeles.

Magnus R. Hestenes, professor of mathematics, University of California, Los Angeles.

Richard Courant, professor of mathematics, New York University.

Menahem M. Schiffer, professor of mathematics, Stanford University.

Ivan S. Sokolnikoff, professor of mathematics, University of California, Los Angeles.

Norbert Wiener, professor of mathematics, Massachusetts Institute of Technology.

H. Frederic Bohnenblust, professor of mathematics, California Institute of Technology.

Gilbert W. King, research chemist, International Telemeter Corp.

George W. Brown, staff engineer, International Telemeter Corp.; visiting professor of mathematics and engineering, University of California, Los Angeles.

Louis A. Pipes, professor of engineering, University of California, Los Angeles.

John L. Barnes, professor of engineering, University of California, Los Angeles.

Edwin F. Beckenbach, professor of mathematics, University of California, Los Angeles.

Charles B. Morrey, Jr., professor of mathematics, University of California, Berkeley.

George E. Forsythe, research mathematician, Numerical Analysis Research Project, University of California, Los Angeles.

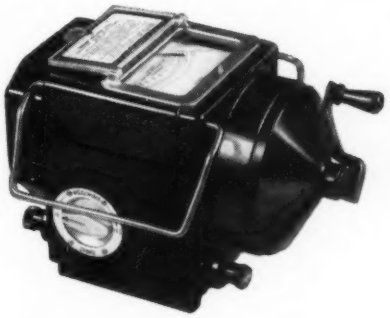
Derrick H. Lehmer, professor of mathematics, University of California, Berkeley.

This book may be purchased through TELEPHONY.

"My prescription for you, Mrs. Scruggs, is that when you have that lost feeling and can't find yourself just turn to the yellow pages...you can find anything there!"

Telephone Trouble-Shooters Find Failures Faster with Biddle Electrical Testing Instruments

Whether it's maintenance, rehabilitation, or special development work, there's a dependable Biddle instrument practically made-to-order for any electrical testing job you face. It's good to know all about these fine instruments . . .
Have you sent for the latest literature?



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are the most generally accepted devices in the world for detecting incipient weaknesses in the insulation of nearly all types of electrical equipment.

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BULLETIN 25-T

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Frequency measurements are made easy with this miniature portable Frahm Resonant Reed Frequency Meter. Vibrating reed tips form a pulsating pattern that makes it easy to read alternating current frequency from 15 to 1500 cycles per second.

Meter is applicable to pulsating or interrupted D-C as well as A-C supply circuits. Sturdy — no delicate pivots, jewels or moving parts. Remains relatively unaffected by external fields and is independent of load, power factor or phase shifts in supply circuit. Available in switchboard, miniature and portable types. Model illustrated is used for checking bell-ringers.

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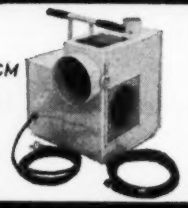

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Denver, Colorado

W. Va. Association Makes September Convention Plans

In a committee meeting at Blackwater Lodge in Davis the West Virginia Independent Telephone Association recently completed plans for its annual convention to be held Sept. 30 and Oct. 1. The 30 convention committee members attending represented 15 of West Virginia's 49 telephone companies which includes the Bell System's Chesapeake & Potomac Telephone Co. of W. Va. Representatives of five suppliers of telephone equipment also took part in the convention planning.

This year's annual meeting of the West Virginia telephone group will be held at the recently completed Blackwater Lodge at Davis.

According to Ed Filler, president of the telephone group and treasurer of the Duncan Telephone Co. at Davis, the convention will permit representatives of the various companies to discuss mutual problems and exchange ideas.

"To give all of West Virginia the best possible telephone service all companies must work together, cooperate with one another, and coordinate a number of activities," Mr. Filler said. "We have been very successful in the past, and these group get-togethers have been partially responsible. All of us are looking forward to years of growth and expansion for both our companies and for West Virginia, and we certainly want to do our part in providing the very best system of communication possible."

American System Best Described as "Responsible"

" 'Free enterprise' is the term which we use most frequently in describing . . . our economic system, but surely the term 'responsible enterprise' would be equally accurate," writes B. Brewster Jennings, chairman of the board of Socony Mobil Oil Co., in the *American Petroleum Institute Quarterly.* "In using it we merely examine the thing from its other side. The other standard phrase, 'private enterprise' suffers, I think, from its suggestion of exclusiveness and the implication that its activity is no one's business but its own."

Mr. Jennings deals with attacks upon business which follow the technique of ignoring facts and playing upon fears and suspicions, no matter how unjustified these may be. The business or industry under attack is represented as big, rich and practically all-powerful, while those on the other

Attending the March planning session for the first convention of the West Virginia Independent Telephone Association to be held in Davis in September were, FIRST ROW, left to right: H. W. Newlin, Chesapeake & Potomac Telephone Co.; R. R. Tupper, Chesapeake & Potomac Telephone Co.; Gerald H. Parks, Duncan Telephone Co.; Association President E. S. Filler, Duncan Telephone Co.; Donald Roush, Home Telephone Co.; D. E. Foster, Chesapeake & Potomac Telephone Co. SECOND ROW, left to right: John Fordyce, Chesapeake & Potomac Telephone Co.; Leo Prendergast, Chesapeake & Potomac Telephone Co.; J. P. Corrall, Duncan Telephone Co.; G. R. Gish, General Telephone Co. of the Southeast; Carl Balentine, The Short Line Telephone Co.; Frank Hoffman, General Telephone Co. of the Southeast; J. M. Bear, Pocahontas Telephone Co.; Fred Stemple, Aurora Telephone Co.; Leo Hanna, The Ritchie County Telephone Co.; James Crane, Preston County Power & Light and Fred Forman, Aurora Telephone Co. THIRD ROW: Jack Cross, Duncan Telephone Co.; Dave McCarthy, Anaconda Wire & Cable Co.; Harold Miller, Kellogg Switchboard & Supply Co.; Gerald Evans, Koppers Co.; Byron Woods, Tygarts Valley Telephone Co.; Harry W. Holland, Kellogg Switchboard & Supply Co.; R. E. Cleland, Stromberg-Carlson Co.; R. W. Ingle, United Telephone Co.; J. L. Pittman, General Telephone Co. of the Southeast; Jud L. Sedwick, Armstrong County Line Construction; John Bear, Pocahontas Telephone Co.; J. G. Raines and Earl Hedrick, North Fork Mutual Telephone Co.

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side are pictured as being poor, weak and defenseless. As he puts it, "The aim is to capitalize on the natural human disposition to sympathize with the underdog and peoples' equally natural fear of the bully." And these attacks, he feels, often have the desired effect—one reason being the public's healthy concern over great concentrations of power.

So, in his view, it is ". . . imperative that every businessman in every industry . . . try to do a better job of informing the public as to the true nature of the American business system and business people." This, of course, applies with particular force to large enterprises—for these are the least understood members of the business community and thus are the most vulnerable to attack and to misrepresentation.

Mr. Jennings feels that business spokesmen often make a basic mistake in answering critics. To quote him again, "We in business almost make a habit of reaching into the past to describe conditions for which the past has no vocabulary. We try to meet hostile ideas . . . with ideas of even more ancient vintage."

Then Mr. Jennings gives a vivid example of this: Without meaning to, businessmen often suggest that today's free enterprise is no different or should be no different than that of the Nineteenth Century—that is, the era of the 12-hour working day, child labor, and other long-dead anachronisms. No responsible man wants to return to such "freedoms"—yet people often get the idea that this is just what business intends when spokesmen talk about freedom from government control.

This is why Mr. Jennings is convinced that there should be much heavier emphasis "on the responsibility side of our economic system as against the freedom side." The business ethics of the present are a far cry from those of other days. And that, as he says, is not solely due to laws and other such controls.

As he sees it, the businessman "owes his sense of responsibility to his conscience, a conscience which has been shaped by the simple, humane principles of the Judaeo-Christian faiths and by the disciplines of the American democratic tradition."

The needed task, in his view, is not "to sell the idea that the American businessman is a saint." It is, instead, to show and convince the public that the vast majority of businessmen ". . . are responsible citizens and that the proportion of irresponsibles in business is extremely small—certainly no more, I should think, than obtains among any group."

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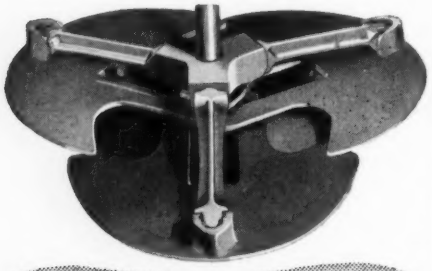

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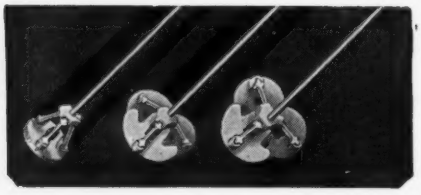

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Stromberg Expands Finance Department Personnel

A realignment of procedures and personnel in the telephone finance department of Stromberg-Carlson, a division of General Dynamics Corp., was announced on April 9 by Charles W. Pritchard, treasurer.

Two men were added to the department and others were reassigned. Paul A. Altpeter, former assistant controller, was appointed assistant manager for administrative procedures, and Carter W. Eltzroth Jr., attorney with wide experience in Independent telephone financing, was named assistant legal counsel.

These additions to the department, which is managed by Phillip J. Lucier, assistant treasurer, were made necessary by the increased volume of loans made by the department to Independent telephone companies. Long term loans are now being made at the rate of several million dollars a year, Mr. Pritchard said. They provide funds for all costs of expansion and modernization, including buildings and labor as well as central office equipment, telephones, materials and supplies.

About 300 loans have been arranged in six years, ranging in amount from $25,000 to more than one million dollars. The average loan is about $100,000. Funds for the program are provided by Metropolitan Life Insurance Co. through General Dynamic's subsidiary, Stromberg-Carlson Credit Corp.

The telephone finance department was organized, Mr. Pritchard explained, to handle the rapidly expanding volume of loans and to serve the Independent telephone industry better. Because of the unique background of experience acquired by the department in the legal, accounting, engineering and operations problems of Independent telephone companies, regular credit work for all Stromberg-Carlson Independent telephone customers has been transferred to the department.

G. Warren Schomaker, assistant manager, will devote his time to loans and regular credit, while Mr. Altpeter will take over operational details. Four regional supervisors were named to handle both regular credit and telephone loans in the areas served by the telecommunication division's branch offices.

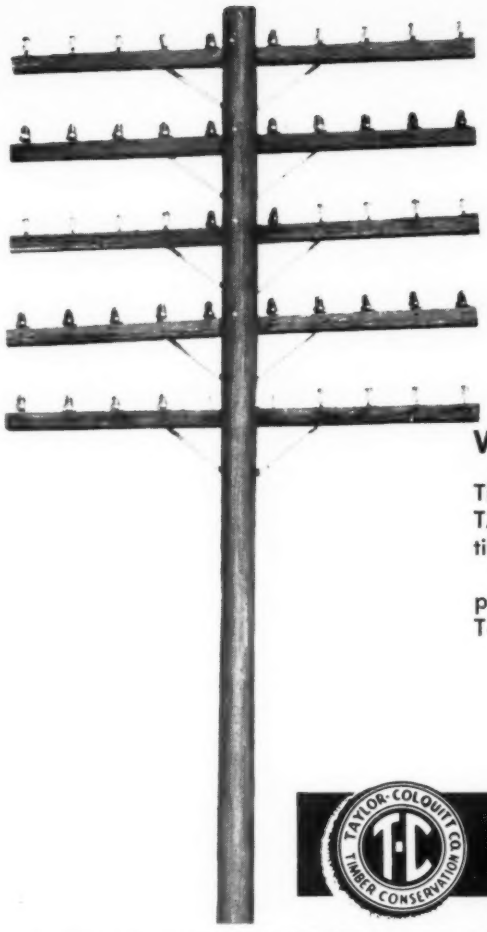
Lawrence J. Cleary will be regional supervisor for the Chicago branch; Robert G. Slayton, Kansas City; Harold W. Moonen, San Francisco and Atlanta; and Robert M. Meyers, Rochester. Mr. Meyers also will serve as assistant treasurer of the Stromberg-Carlson Credit Corp.

Two field engineers are employed by the department for appraisals and plant engineering for loan customers. They are Randolph D. Shoemaker and Robert H. Phelps. Specifications of central office equipment financed by the program are prepared by John W. Tegelaar and Edward J. Merkel.

George C. Gordon, legal counsel, will be assisted by Mr. Eltzroth, who comes to Rochester from Indianapolis, Ind.,

Members of the telephone finance department of Stromberg-Carlson, a division of General Dynamics Corp. Seated, from left to right are: Carter W. Eltzroth, Jr., assistant legal counsel; G. Warren Schomaker, assistant manager; Phillip J. Lucier, manager and assistant treasurer; Paul A. Altpeter, assistant manager; George C. Gordon, legal counsel. Standing, from left to right: Robert H. Phelps, field engineer; John W. Tegelaar and Edward J. Merkel, equipment engineers; Robert M. Meyers, Lawrence J. Cleary, Harold W. Moonen and Robert G. Slayton, regional credit supervisors. Absent is Randolph G. Shoemaker, field engineer.

XUM



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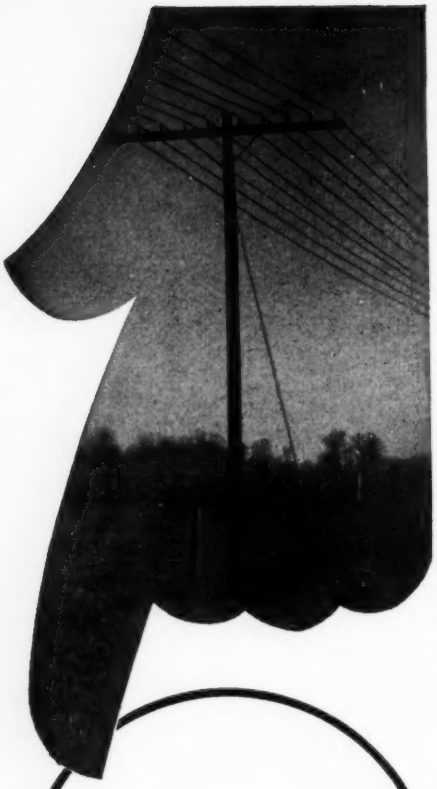

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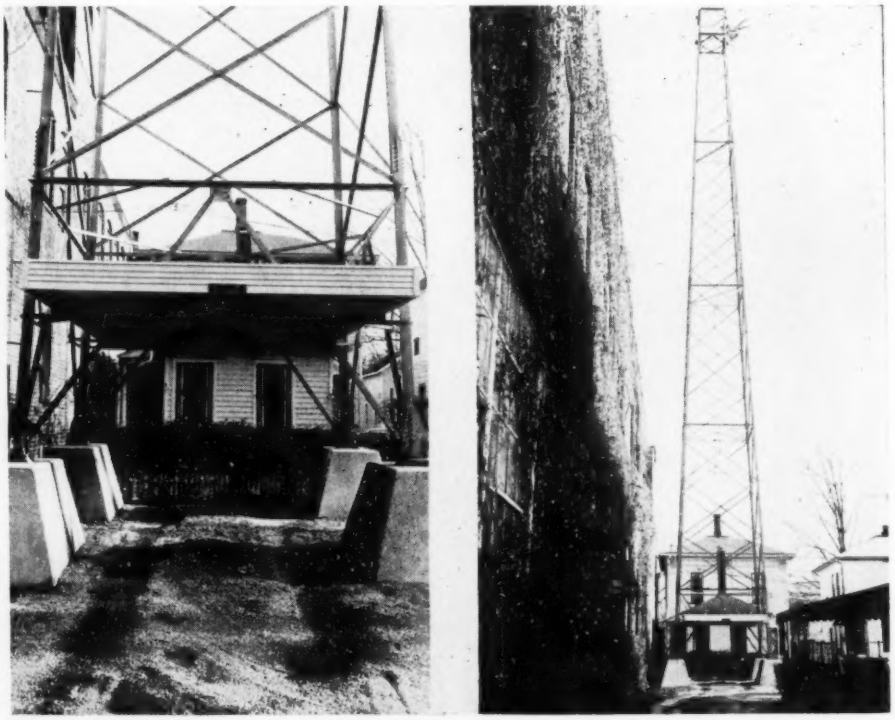
where he was associated with Goodrich, Campbell & Warren for eight years. In this capacity Mr. Eltzroth handled legal work for Stromberg-Carlson and worked with Independent telephone companies on financing, rate matters and questions of territorial authority. He is the co-author of the Territorial Authority Act, passed by the Indiana Legislature to provide means of determining boundaries for exclusive telephone service.

Mr. Eltzroth, a Phi Beta Kappa graduate of Wabash College in 1941, received a bachelor of laws degree from Harvard Law School in 1948. Prior to graduation he served in the Army and received battle stars for five Pacific campaigns. He is now a lieutenant colonel in the Reserves.

Mr. Altpeter brings to his new job as assistant manager of the telephone finance department wide experience in financial matters. He joined Stromberg-Carlson in 1945 and later was named assistant controller. Prior to that he was employed by Bausch & Lomb Optical Co. and Stecher-Traung Lithograph Corp. He is a graduate of Syracuse University and received a master of science degree in finance from American University Graduate School. He is a past president of the Rochester Chapter, National Association of Cost Accountants.

Workers' Best Interests

"*The Advertiser*, of Calais, Me., points out that in many parts of the world socialists are worried because workers prefer jobs in private industry as against jobs in nationalized industry. It cites two examples. The private industry in Soviet East Germany has been taking the more efficient workers away from state-owned companies. And Bolivia's experiment in government operation of the tin industry failed primarily because of low worker productivity—they worked harder for private owners than they did for the government. This is not surprising. Workers can bargain with private industry and get improved wages and working conditions. But when government is the boss, it calls the tune as it sees fit, and anything resembling equality of bargaining is impossible. The moral: The masses of working people always get the short end of the stick under socialism."—*Industrial News Review.*



What may be the only carport of its kind in the world is located in Norwalk, O., where it is part of a modified Type H microwave tower designed and fabricated by Blaw-Knox Co., Pittsburgh, for the Northern Ohio Telephone Co. Perhaps more important than the carport itself, however, is the fact that towers can be designed to meet almost any space requirement. The unique carport is at the base of a 100-foot, self-supporting tower, one of two installed for the telephone company to improve its long distance service for more than 18,000 of the firm's 98,422 customers. The other tower is located 14½ miles away in Willard, O. With or without the carport the telephone company expects the tower—with a 6-foot wire mesh "dish"—to aid in reducing the cost per circuit mile for toll lines as well as maintenance in an area plagued by heavy sleet "loading." This tower and its Willard companion are capable of supporting additional reflectors.

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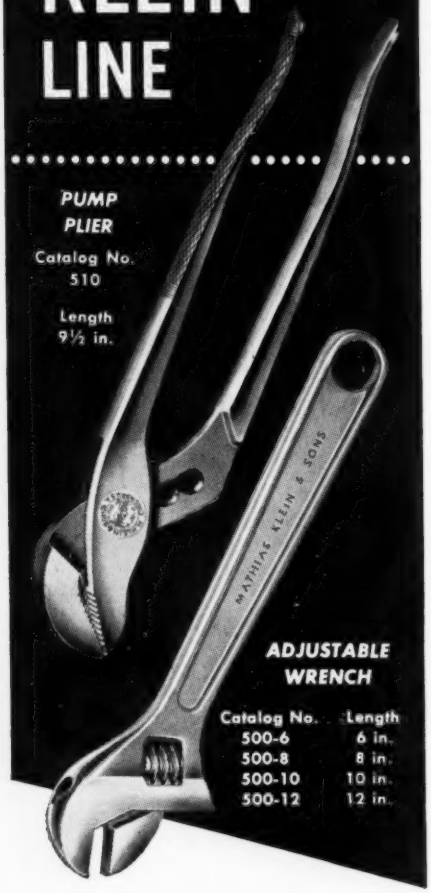

These new high-quality tools have been added to the Klein line.

A Pump Plier that gives easy one-hand operation and a firm grip in any of four positions.

And the new Klein Adjustable Wrenches of drop-forged alloy steel, light in weight, chrome plated for lasting protection and service.

Write for Bulletin

Bulletin No. 1157 on these two Klein tools is now available. Send for your copy.

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News on New Products

PIPE AND CONDUIT BENDER — A new lightweight hydraulic bender that will make a full 90° bend in 4 inches and smaller conduit and pipe with one ram stroke has been announced by Greenlee Tool Co. According to reports of on-the-job tests made by contractors, the new lightweight No. 884 Power Bender eliminates costly time-consuming extra setups usually required when making 90° bends on pipe of this size.

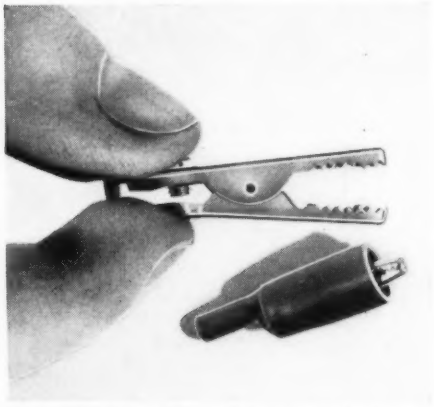
It was possible through the use of high-strength aluminum alloy to make this 40-ton bender light enough for one man to carry the heaviest section with ease. Specially designed pipe supports serve as rollers when wheeling bender from one location to another. Due to its design this bender can be used in any position without loss of operating efficiency.

New quick-change, positive-locking pipe support pins make possible easy, fast removal of pipe supports which means quick insertion and removal of pipe from the front of bender with the frame always remaining in one piece, the company states.

Regularly operated with the No. 798AC-SA Power Pump, and connected by a quick-coupling high-pressure hose, the No. 884 will bend 4-inch pipe 90° in four minutes. If higher bending speed is desired the Greenlee No. 797E-SA Power Pump will do the job in only 30 seconds. Any other high-pressure power pump of up to 10,000 psi can be used with this bender. The new bender can be used with other Greenlee attachments for bending thin-wall conduit, tubing, and bus-bar. Request NP649.

•

ALLIGATOR CLIPS — An entirely new series of alligator clips is being announced by Mueller Electric Co., similar in size and purpose to its "60 Series"



but constructed by different techniques, and featuring simplicity and functionalism.

The "barrel" found on the "60 Series" has been changed to utilitarian cord strain relief ears. The patented

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Please have the manufacturer send me without obligation the literature indicated by the following numbers:

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An 8-tier run of Soapstone OCT-O-DUCT provides a new telephone link down hard-rock Nob Hill to colorful Chinatown in San Francisco.

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1 Trenchside delivery of Soapstone OCT-O-DUCT eliminates field inventory problems and makes certain your duct is at your job when you need it.

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3 OCT-O-DUCT's exclusive, flat-sided design eliminates the need for expensive interlayer spacers. Duct will not roll.

4 OCT-O-DUCT is connected in the trench with easy-to-apply circular couplings making possible fast, rhythmic, production-line installation.

The many time- and work-saving features of Soapstone OCT-O-DUCT and full information on the sizes, bends and accessories available from this 30-year-old Company are contained in our Catalog and Installation Manual. For your FREE copies, drop us a note on your letterhead.

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extruded hinge originally appearing on the "Mini-gator" has been applied to the new "70 Series" alligators. The teeth of the new clips have been redesigned for maximum effect in gripping shapes of all kinds, at many different angles.

The new series includes three types: Cadmium-plated steel clip without the screw, for solder connection only; an identical clip, but with a screw connection; and a solid copper clip with screw connection.

The cord strain relief ears grip the insulated portion of the wire, preventing bending and eventual breaking of the wire itself. The ears also provide greater speed and convenience in soldering. The bared wire is first passed under the soldering strap and the ears then crimped against the insulation, holding the wire in perfect position during the soldering operation. Request NP650.

•

TRUCKS—The climax of 50 years of motor truck production now is being marked by International Harvester Co. with introduction of a new "Anniversary

Line" of International trucks that ranges from a half-ton A-100 series at 4,200 pounds gross vehicle weight to the heavy-duty cab-forward six-wheel ACF-180 series at 33,000 pounds GVW.

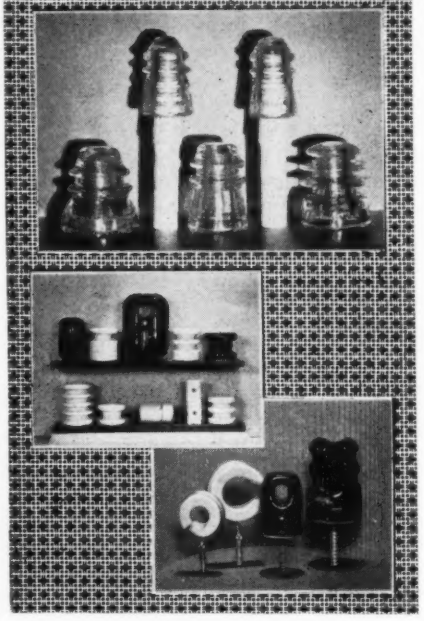
These new Internationals, produced predominantly at the company's Springfield, O., plant, offer redesigned high-efficiency truck engines, improved maneuverability, and driver comfort features that include a new cab with the widest inside dimensions of any comparable model, according to W. C. Schumacher, vice president in charge of the company's motor truck division.

Designated the A-line, the new trucks are available in a full range of four and six-wheel and all-wheel-drive, gasoline and LPG-powered units, in conventional and new cab-forward design. Request NP651.

•

PLUG-IN SOLDERING IRON—This latest addition to the line of American Beauty soldering irons is a pencil-type model which operates from its own 12-volt output transformer.

For Satisfaction Order Them From Suttle Stock



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Fifty years ago Hemingray glass insulators stood for quality—today they still do — the five popular telephone styles are always in stock.

Porcelain Products Knobs

Careful mixing of the clays provides a uniform quality material highly resistant to breakage — along with accurately controlled "firing" PP knobs and insulators are of the finest quality you can buy.

Pearl Screw Brackets

Made at the Pearl factory—where the "Pearl" patent on the lead sealing originated — these are the genuine product with all the pride of the inventor behind the quality of the product.

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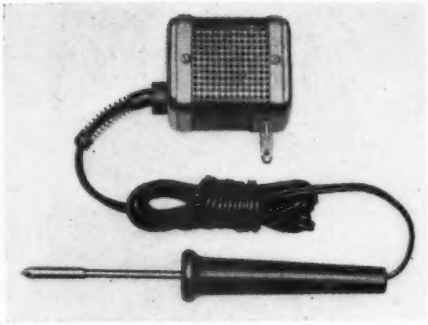

The American Electrical Heater Co. designed the Model T-12 iron especially for precision soldering on delicate or miniature electronic components. It can be used for any production soldering requiring an extremely lightweight, slim-casing soldering iron of very small tip-diameter.

A feature is the design of the 110-volt ac to 12-volt ac transformer equipped with integral plug-prongs which fit the wall or bench receptacle outlet. Since the transformer is supported by the outlet, it never interferes with the balance or handling of the iron. The low-voltage output makes possible the use of the heating element in a very small tip.

The soldering iron itself, including its 7-foot cord weighs only 3½ ounces, and has easily interchangeable slip-in ¼ inch, ⅛ inch, or 1/16 inch diameter tip-elements. The pre-tinned tips are quick-heating, taking only 60 seconds to reach solder melting temperature. Tip-elements, 17 watts; high-heat type, 20 watts.

In addition to compact size, the company reports, other advantages of a design using 12-volt current are extra long element life, cool, non-fatiguing handle and complete isolation of the iron from line voltage, most important when working on delicate electronic components such as meter, relays and transistors.

The new American Beauty soldering iron features practically an unbreakable handle, tip elements of Armco ingot iron, brazed to a stainless steel casing and a heavy duty transformer with 2,500-volt insulation. Request NP652.

•

TRUCK BODIES — A new line of IU-76 telephone installer bodies is now available from J. H. Holan Corp.

The back compartment of the bodies includes three sliding materials drawers; a larger sliding drawer for inside wire and cords; a drop wire reel on a sliding shelf; a section for long tools that extends through the body; a sliding drawer for directories and backboards; and space for installer's bags, tree trimmer and other equipment. Porcelain or plastic tubes and long bits can be stored on the rear door.

Telephone batteries engineered for—

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years of service

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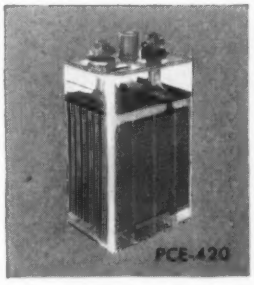

If you want extra-long life from batteries in telephone service—be sure to specify C & D PlastiCal® batteries.

Here is the original lead-calcium telephone battery that provides at least 40% longer life than conventional telephone batteries. With C & D PlastiCal telephone batteries you get:

- **Reduced maintenance**—Electrolyte level can be checked at a glance; cells require 1/5 as much water as conventional batteries.
- **Lower in-place cost**—Rugged one-piece plastic case is 20% lighter than glass; reduces shipping and breakage costs.
- **Increased safety**—C & D's patented Saftee-Vent eliminates the chance of accidental explosions; serves as funnel for filling.

These plus many other benefits mean that in the telephone field, C & D is—

Your better battery buy!

Literature available

Write for complete description and specifications in C & D PlastiCal Bulletin T-528.

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The right side compartment has two sliding drawers—one for materials, one for outside wire, P wire guards and miscellaneous. There is also room for saws, rubber goods, body belts and climbers.

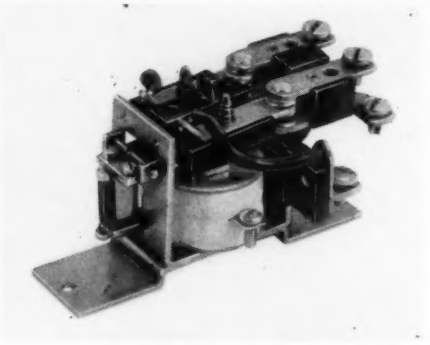
The left side compartment has a sliding shelf for the spare tire.

Overhead brackets for various types of ladders are available. Request NP653.

•

INDUSTRIAL RELAY — A new general purpose relay designed by Wheelock Signals, Inc., incorporating such design features as inter-changeable coils and a removable multi-position base is now being offered to the equipment manufacturer and industrial user. Contacts rated at 20 amps, 115 volts 60-cycle ac or 24-volt dc, are single-and-double pole, single-and-double throw. Mounting arrangements are provided for auxiliary SPDT contacts if desired. The relay is 2-7/16 inches high with a base measuring 1 inch x 3⅞ inches.

Special design details have been incorporated in this relay with the aim of making it readily adaptable to a variety of applications. Small size and

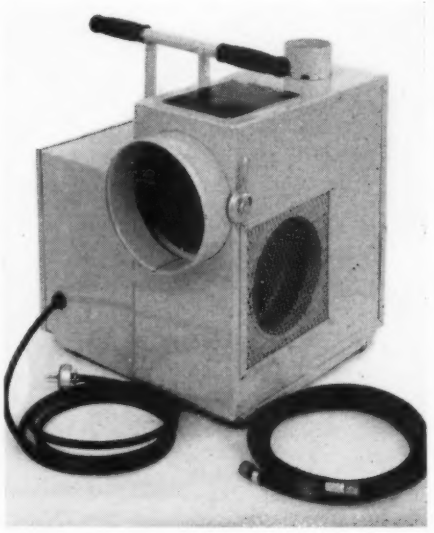


compactness, choice of mounting base (metal strap or bakelite) choice of coil voltages (ac—six through 230 V, or dc—six through 115 V), and choice of terminal connections combine to make the relay truly versatile.

The General Purpose Relay is conservatively rated and is built to provide reliable, trouble-free service over long periods of time, when used within the limits of its rated capacity, according to the company. The space requirements have been reduced to a practical minimum, consistent with good electrical standards, and meet the requirements of the Underwriters' Laboratories. Typical applications include: Motor control circuits; as a starter for fractional hp motors; operation of signalling devices; as a relay in circuits controlled by thermostats, pressure switches, float switches, photoelectric devices, etc. Request NP654.

•

UNDERGROUND VENTILATING HEATER—A new ventilating heater designed especially for year round underground operations is being produced by Morrison-Pelsue Co.



Operating on either ac or dc from portable generator power to 110-volt power tap, the MoPeCo model ACM (or DCM) ventilating heater furnishes a constant supply of forced fresh air to manhole workers, preventing accidents caused by explosions or oxygen deficiency, enabling workmen to work with greater speed and safety. Its heater warms old paraffin splices.

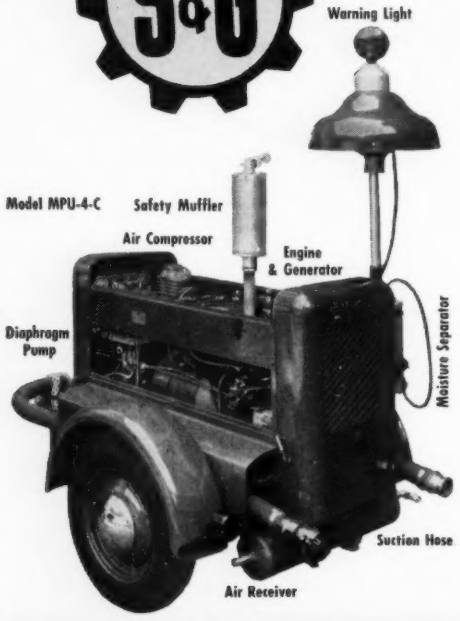
MoPeCo models ACM or DCM are portable, weigh 70 pounds and blow from 300 to 800 cfm fresh air for summer operations. In winter, when warm air is desired the MoPeCo units are ignited by spark ignition. The automatic spark ignites a 45,000 btu propane burner which can be controlled to give 10° to 90° F temperature rise in the manhole.

A stainless steel combustion chamber and heat exchanger is standard equipment. Only fresh air is blown into manhole, since combustion products from the burner are blown into the air. Fresh air passing over the heat exchanger is heated and forced into the manhole through a light weight, flexible Spiratube duct.

An automatic gas shut-off valve is an

dependable . . . versatile . . .

S&G Mobile Power Unit



- Generator (slow speed for quietness) 2500 Watt, 110-Volt DC
- Pump—2800 GPH Diaphragm to remove seepage and drain back
- Air Compressor—to put cables under pressure for cut-overs or repairs

Furnished with or without pump and compressor

- 300-Watt floodlight illuminates working area
- operates soldering pot and iron, electric and air tools
- electric blower to ventilate manhole
- supplies dry air for cable cut-overs, flash testing, etc.
- diaphragm pump can be operated from manhole by push button control
- buzzer signal for summoning helper
- light, easy to handle

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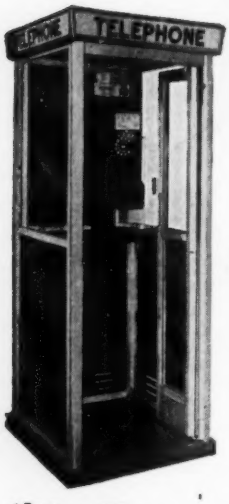
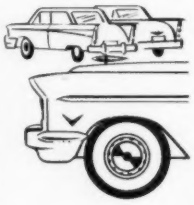


FOR PARKING LOTS



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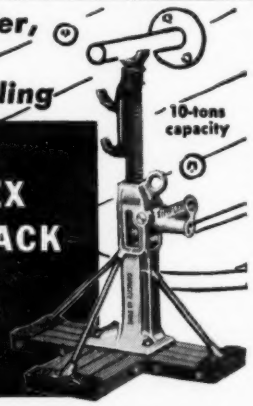

NEW **SIMPLEX REEL JACK** with Lightweight Aluminum Housing

●Here's the reel jack that is strong and stable without hard-to-handle extra weight. An aluminum alloy housing reduces overall weight by 21 pounds, yet maintains full 10-ton capacity. "T" shaped laminated oak base gives solid, safe foundation. Single acting mechanism provides easier operation. Handles reels to 84" dia.; weighs 83 lbs. Furnished with 5' lever bar.

Write for full data on Reel Jack No. A-1029 and other Simplex Utility Jacks.

Pole Pulling and Straightening Jacks—Save time, cut work crews necessary to pull, straighten or move poles. No. A-1538 has aluminum housing, 15-tons capacity, weighs 63 lbs.

All-Purpose Jack — No. 310A lifts, pulls, pushes at any angle. Four lift points. 15-tons capacity.

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added safety feature to cut off gas in case of power or burner failure. Repeated tests show absence of CO and CO_2 gases in the airstream. Request NP655.

•

SNAKE BITE KITS—Field workers operating alone in poisonous snake regions can be equipped with individual Saunders' snake bite kits and leather carrying cases manufactured by Medical

Supply Co. The cases slip onto workers' belts and provide them with a convenient means of carrying immediate snake bite treatment in all types of terrain.

The snake bite kits fit snugly into the cases, but can be easily and quickly slipped out by the worker in an emergency. A special venom-suction pump, constriction band, inhalants, iodine swabs and bandages are included in the kit.

These new leather cases are available in either single or double kit size. The double case makes it possible for the worker to carry a Medical Supply Co. first aid kit, as well as the snake bite kit for additional protection. Request NP656.

•

REEL TRAILERS—A complete line of safety reel trailers, including models to handle from one to four reels at a time, has been introduced by the Ottawa Steel Division of L. A. Young Spring & Wire Corp.

Multiple reel models with lifting capacities of 3,500 pounds per reel, have been designed to handle all sizes of spools of electric cable. Pickup arms lower to 12 inches above ground, to handle spools as small as 24 inches up to 54 inches in diameter without special attachments.

A single reel model has also been designed to handle large reels of telephone cable.

Engineered with two thoughts foremost in mind, Ottawa Reel Trailers, according to the company, provide (1) a safe one-man foolproof method of handling reels without danger or extra expense, and (2) a rugged and simple design which will withstand years and years of service.

Twenty-two inch disc type friction brakes on each reel prevent overspin and free wheeling, and provide controlled friction for tension stringing. A precision tensioning device is also available.

No lifting is required by the operator. Reels are rolled in between lowered arms and lifted by push button controlled electric winch (or hand winch when no power is available). A hydraulic winch is also available as optional equipment.

Electric winch is designed to prevent any possibility of overloading the lifting cable. Reels roll freely, with no possibility of dropping a reel from top rails, even if rolled crooked. Spindle bars safely lock into place with automatic locking ball lock pins. Reel shaft cannot slip or jump out of place and drop reel while being hoisted, even if the operator should fail to close bearing caps. Lifting arms locked in place in loaded position become part of the side frame, for added strength. Front caster and jack fully retracts to clear underside of frame when in travel position.

Ottawa Reel Trailers are equipped with 12 inch x 1¾ inch electric brakes, tail lights, stop and directional lights, electrical connector, and trailer hitch for operating behind a truck.

In emergencies, one man in a pickup can load and transport reels to a trouble spot without holding up a complete crew. One man can load two reels and be on his way in less than three minutes, or four reels in less than ten minutes. Request NP657.

•

AIR CLEANERS—Three new models have been added to the "Compact" line of Electro-air electronic air cleaners made by Electro-air Cleaner Co.

Two of the new units have greater air cleaning capacity than any of the nine models formerly comprising the "Compact" line. The third new unit augments existing models in the high side of this product category.

All three models were introduced, says the manufacturer, to make possible more accurate sizing plus more efficient

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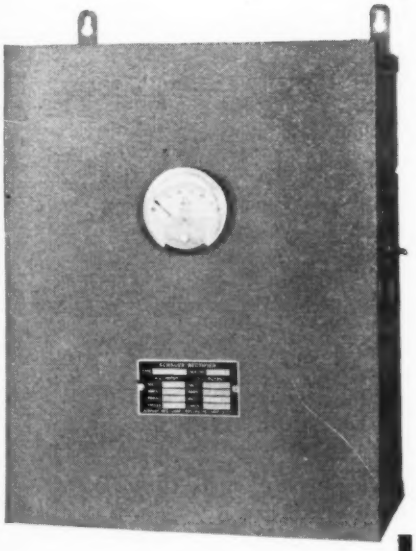

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and economical installation of electronic air cleaners in medium-sized telephone exchanges.

The new Electro-air models are: 132-H which has a capacity to clean 3,200 to 4,000 cubic feet of air per minute; No. 160-H that can clean 6,000 to 7,200 cfm., and the No. 180-H which has an 8,000 to 9,600 cfm. capacity.

The new model 132-H is sized for installation with heating equipment having 320,000-400,000 BTU input and with 7½ tons capacity cooling equipment. The 160-H and 180-H are for installation with 600,000 to 960,000 BTU input heating equipment, and with 15 to 20 tons capacity cooling units.

These new electronic air cleaners, reports the maker, may be installed to operate in conjunction with any standard equipment for heating, cooling or moving air. It indicates the component parts of the newer units, and said to be true with the nine older models—including selenium rectifiers, transformers and ionizing wires—are guaranteed for five years against defective material and workmanship.

The new Electro-air models are designed for a horizontal flow of air. They have a double manifold washing system to flush trapped dust, dirt, lint and pollen from the collecting plates. Semi-automatic and completely automatic washing systems are available.

Electronic air cleaning is reported to successfully have solved a problem for one of the country's fastest growing Independent telephone companies.

By 1955, the North Pittsburgh Telephone Co. of Gibsonia, Pa., had assembled one million dollars worth of intricate electrical equipment in its Gibsonia, Pa. headquarters building.

Management could then have taken the stand that no additional investment in central office equipment should be made at that time, But, experienced operating personnel pointed out that by increasing the investment 2/10 of 1%, positive protection was assured against certain types of "poor service" complaints.

This small investment would provide electronic air cleaning in the automatic equipment area. Impurities in the atmosphere would be removed before they could damage electrical equipment or cause interference in telephone service.

So, about $2,500 was spent to install an Electro-air electronic air cleaner adjacent to the summer-winter air conditioning unit. Ducts connected the model C-205 Electro-air with the return air opening of a model 1015 Airtemp summer-winter unit. Thus all air passing through the air conditioners had to first

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Cut off taper and use "hex" shank in both power drills and hand braces

Cut your wood bit inventory by 50%

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With hand braces, use the Adapter Shank Bit as it comes. Cut off taper square and the Adapter Shank, with its 6 "hex flats", chucks perfectly in power drills or hand braces, either one. No wobble, no run-out. Clean, efficient cutting action. Reduces inventory and record keeping by 50%. Saves time on the job, too. Call your distributor, or write today for complete information. Sizes 4/16″ to 17/16″, both solid center and single twist types.

All Irwin Adapter Shank Wood Bits are forged in one piece from special steel and heat tempered full length for longer life. Plastic coating on balanced cutting heads guarantees factory-fresh sharpness, unequalled performance. Widely used by utilities, electricians and construction workers.

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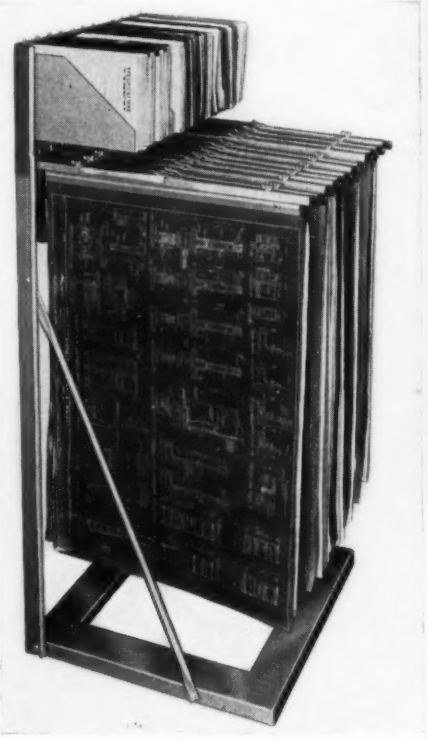
travel through the electrostatic field of the air cleaner.

In the two years since installation, electronic air cleaning definitely has prevented equipment failures due to dust, lint, dirt, and pollen in the automatic equipment area.

The air cleaning in the automatic equipment area also has kept its walls and ceiling free from smudge and stain. Request NP658.

•

VERTICAL FILING SYSTEMS — Data-File has been added to Plan Hold Corp's. line of vertical filing equipment which already includes: Wall racks, rolling stands, carousel units, filing cabi-



nets and the standard Plan Hold which may be used in "home-made" racks.

Holes and other mutilations are eliminated with the all aluminum Plan Hold friction type binders. Request NP659.

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Stromberg Names Dr. Weller Engineering Vice President

Dr. Royal Weller, chief scientist, Naval Air Missile Test Center, Point Mugu, Cal., will join Stromberg-Carlson, a division of General Dynamics Corp., as vice president in charge of engineering on May 1, according to an announcement made on April 5 by Robert C. Tait, Stromberg-Carlson president.

In this position, Dr. Weller will advise with the president and other officers of the company on all technical matters and will operate in a general staff capacity as coordinator and consultant to all Stromberg-Carlson engineering groups, including research, and the engineering staffs of the telecommunication, electronics and special products divisions.

Dr. Weller, who was born in Westfield, Mass., received his S.B. degree in Electrical Engineering at Massachusetts Institute of Technology in 1927, his M.S. degree in Physics at Ohio State University in 1934 and his Ph.D. in Physics at Ohio State in 1939. Since 1949 he has served as chief scientist, Naval Air Missile Test Center, Point Mugu, Cal., and as senior scientist at this center, has been technical advisor to the commanding officer,

DR. ROYAL WELLER

as well as to the chief of the U. S. Navy Bureau of Aeronautics in Washington. His present duties are concerned with guided missiles and related air-borne weapon systems.

Following his graduation from M.I.T. he worked briefly with the General Electric Co. and the Amrad Radio Corp., before joining the Rochester Institute of Technology, Rochester, N. Y. as an instructor in the department of mechanical engineering in 1928. In the summer months he worked in various Rochester industries.

During the years 1936 to 1939, Dr. Weller devoted his efforts to graduate study at Ohio State University, and also served as an instructor in physics in 1938 and 1939 and a graduate assistant for the two previous years. He was concerned with research in photoelasticity and in numerical analysis, in addition to teaching assignments.

Dr. Weller spent the period 1939-1941 as a member of the staff of the mechanical engineering department at the State College of Washington. His responsibilities included operation of the materials laboratory and an N.A.C.A. research contract, in addition to teaching.

During 1941-1949 he served as physicist and engineer at the Naval Ordnance Laboratory, White Oak, Silver Spring, Md., becoming chief of the engineering department and directly in charge of all development work. This included major engineering responsibility in the field of mines, torpedoes, ammunition, fuses, plastics, and a variety of other areas.

Dr. Weller is a Fellow—American Physical Society, member—American Society of Mechanical Engineers, member—Institute of Aeronautical Science, member—Society for Experimental Stress Analysis, and member—Opera-

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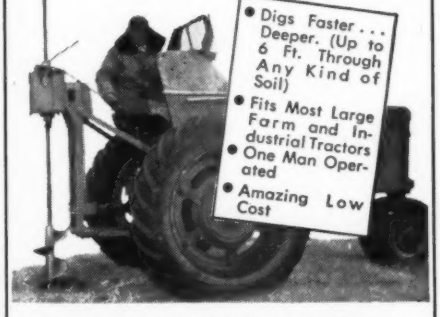
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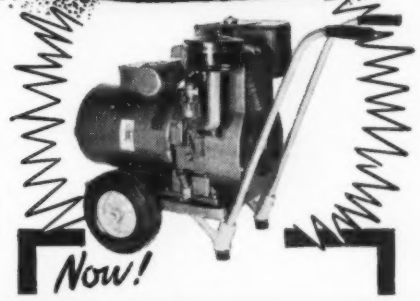

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tions Research Society of America. He is listed in American Men of Science, member of the Cosmos Club, Washington, D. C., member of Sigma Xi and has been awarded the Navy Distinguished Civilian Service Award.

A number of Dr. Weller's technical papers have been published in The Journal of Applied Physics, The Journal of Applied Mechanics, The Proceedings of The Society for Experimental Stress Analysis, and other technical journals. He has also contributed to a large number of symposia and conferences on classified military technical matters.

Dr. Weller represented the Navy at the 1946 Congress of Applied Mechanics in Paris, and presented the results of original work in numerical analysis.

IBM Names C. K. Rissler to Communications Sales Post

Charles K. Rissler has been appointed senior special representative, communications department, for the eastern sales region of International Business Machines Corp. He will coordinate sales activities and planning of applications of IBM equipment to meet the needs of customers in the communications field. He will also conduct classes for customer personnel and IBM sales representatives, to keep them abreast of machine accounting and data processing developments in communications.

C. K. RISSLER

Mr. Rissler joined IBM in 1941 in Oakland, Cal. He subsequently served in Salt Lake City and San Francisco. He was named branch manager in Salem, Ore. in 1954, and special representative in communications in New York the following year.

Rome Cable Corp. Purchases Pennsylvania Company

Rome Cable Corp., Rome, N. Y., has just completed negotiations for the purchase of plant, equipment and other assets of T. J. Cope, Inc., Collegeville, Pa., effective April 1. This announcement was made in a joint statement on April 1 by H. T. Dyett, chairman of the board, and A. D. R. Fraser, president of Rome Cable Corp.

T. J. Cope, Inc. was organized by Mr. Cope in 1885 and has been owned and operated by Edgar W. Baird Jr. from 1934 until his death early this year. The company has been a manufacturer of special products for the electrical industry. In 1948, it pioneered the development of expanded steel cable troughs, a product now widely used by electric companies and many industries as a wiring system. Other products currently produced include cable pulling devices and certain tools and equipment used for the installation and maintenance of underground electrical transmission and distribution power systems.

Manufacturing facilities for the Cope company are located in a recently-acquired modern factory in Collegeville, Pa., just outside of Philadelphia. The plant has been under the supervision of

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- SERVICE
- NATIONALLY KNOWN TELEPHONE SUPPLIES

Prompt delivery of your order as specified is assured by Lindsay's fast, efficient, personalized service. Lindsay specializes in telephone supplies *only* . . . warehousing a complete line of the finest nationally known brands . . . your guarantee of the best as you want it . . . when you want it.

LOOK TO LINDSAY

THE LINDSAY TELEPHONE SUPPLY CO., Est. 1939
10409 Meech Ave., Cleveland 5, Ohio • Telephone Diamond 1-9212

XUM

Allen M. Ziegler, vice president and general manager since April 1955, and he will continue to manage the operations. Details will be announced at a later date on how this company is to be integrated into Rome Cable's organization.

Rome Cable Corp. has an electrical wire and cable plant in Rome, N. Y., and in 1950 purchased an electrical conduit manufacturing company in Torrance, Cal.

IT&T Subsidiary Introduces New Teleprinter Unit

A new teleprinter designed for U. S. requirements has been introduced by Intelex Systems, Inc., a subsidiary of International Telephone & Telegraph Corp. It is manufactured by IT&T's German affiliate, C. Lorenz, A. G., of Stuttgart. The new Intelex teleprinter is no larger than teleprinters currently in use in the United States, and embodies many facilities within the one unit which formerly required accessory equipment and attachments doubling its size and bulk, the company states.

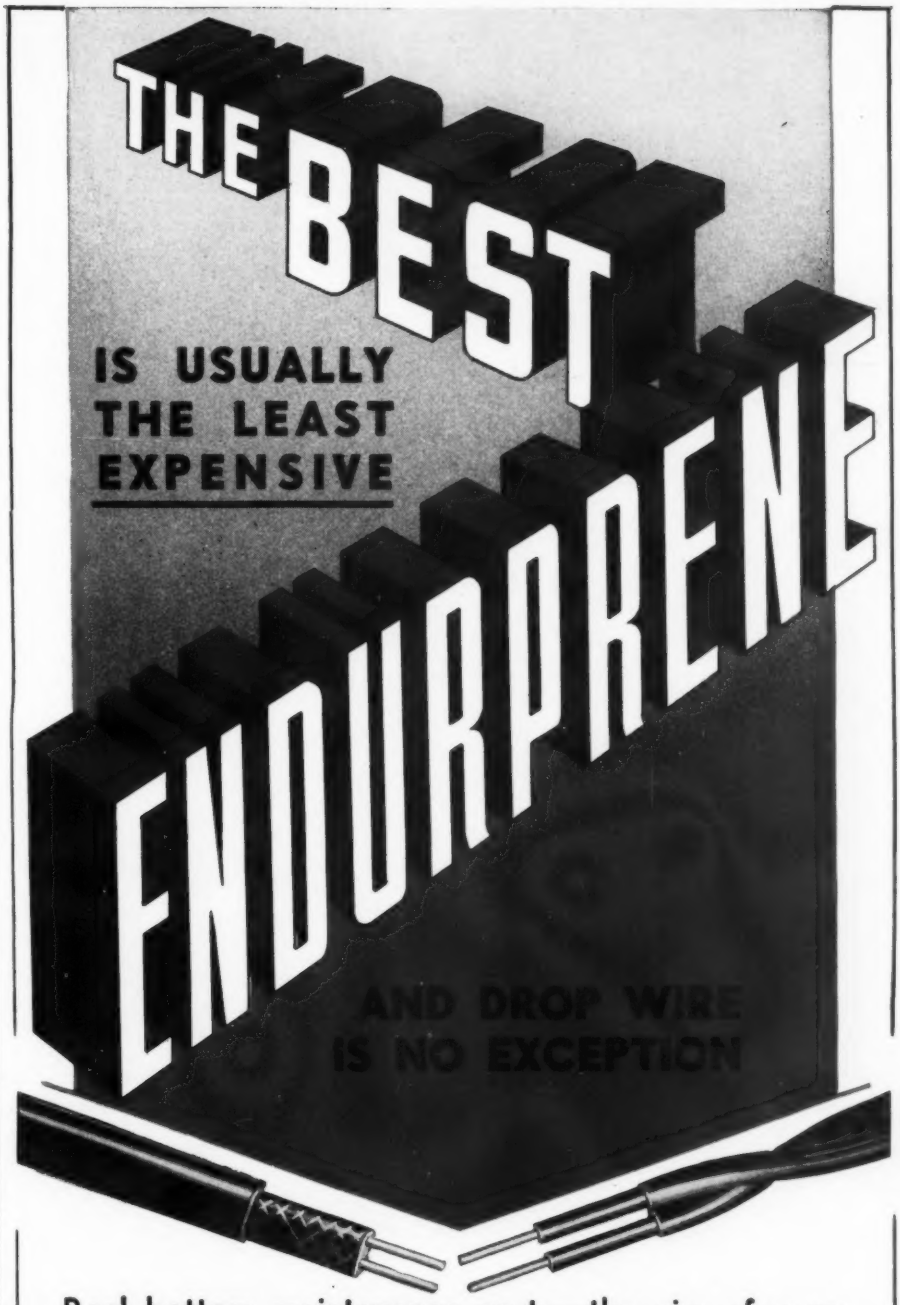
The teleprinter has facilities for preparation of tapes for automatic transmission incorporated as an integral part of this teleprinter, and messages can be prepared for tape and transmitted separately or simultaneously. An additional feature is an automatic switch to shut off the teleprinter motor when 30 seconds elapse without a key being depressed.

In International Telex service, in which there is direct operation between the teleprinters of any two subscribers, much the same as for a telephone call, the Intelex teleprinter is especially adaptable. International Telex permits the sending of regular messages, or written conversations, merely by typing the International Telex number of the desired overseas station. Confirmation of the correct through connection is made by means of an automatic answer-back, upon receipt of which two-way teleprinter communication can take place. The automatic answer-back unit is an integral part of the teleprinter and heretofore has been unavailable in the United States except as an accessory attachment.

Introduction of the new Intelex teleprinter makes available a compact communications device for simple integration in existing wire and radio systems, and for integrated data processing of sales, inventory, statistical and related information, IT&T states.

The Crucial Test

Men will wrangle for religion; write for it; fight for it; die for it; anything but live for it.—COLTON.



Rock-bottom maintenance costs—the aim of every on-the-ball plant executive—come when you buy the drop wire that stays up, year after year, storm after storm.

NEOPRENE

Ask your own Kellogg man for the whole story. He will be glad to furnish you an interesting box of samples.

DISTRIBUTED BY:

KELLOGG SWITCHBOARD & SUPPLY CO.
CHICAGO, ILLINOIS

GENERAL INSULATED WIRE WORKS, INC.
PROVIDENCE 5, RHODE ISLAND

CLASSIFIED SECTION

Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less.
Classified advertisements must reach us 8 days before publication date.

POSITION WANTED

AUDITOR—Class "A" company, university graduate experienced in all phases of telephone accounting interested in relocating. Write Box No. 3963, c/o TELEPHONY.

RESIDENT ENGINEER—age 34, 15 years experience in all phases of telephone work desires permanent position as manager or plant superintendent. Write Box No. 3960, c/o TELEPHONY.

WANTED

OUTSIDE PLANT ENGINEER

For internationally known export company with headquarters in New York City. Must be familiar with design and construction of modern telecommunications systems. Some foreign travel required. Knowledge of Spanish or other foreign language desirable, but not necessary. Good starting salary, excellent future. Send résumé of education and experience to Box No. 3967, c/o TELEPHONY.

HELP WANTED

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1211 Kenmore Avenue, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

WANTED: Telephone Installers, Cable Splicers, Linemen, Central Office Installers. Yates Construction Company, 1507 South 6th St., Paducah, Kentucky. Telephone 2-4623.

PLANT ENGINEERS for large Independent Telephone Company. Some experience necessary. In reply state age, educational and employment history. Address reply to Personnel Supervisor, Rochester Telephone Corporation, 10 Franklin Street, Rochester 4, N. Y.

OUTSIDE PLANT ENGINEER for growing company in Southeastern United States. Will have full responsibility for engineering within operating area. Some experience necessary. Write Box No. 3966, c/o TELEPHONY.

WANTED TO BUY

USED CAX DIAL SWITCHBOARD up to a 50 line E/W two trunks if possible. Write Hubert E. Tyler, R. R. No. 1, Box 204A, Durango, Colorado.

WANTED TO BUY

THREE OR FOUR POSITION TOLL BOARD. Send details with price to Box No. 3965, c/o TELEPHONY.

WANTED A. E. HARMONIC RINGERS D-56440 A-B-C-D-E. Telephone Engineering Co. Simpson, Penna.

TELEPHONES—all types—any condition; candlesticks, wall sets, etc. Write advising quantities available. Our truck will pick up. Reply to Box No. 3952, c/o TELEPHONY.

TELEPHONE EXCHANGE OF FROM 250-500 subscribers. Most any location. Write William L. Heuer, Box 227, Stickney, S. D. giving full particulars first letter.

A 250 to 350 STATION MAGNETO TELEPHONE EXCHANGE by private individual. Send necessary information in reply. Write Box No. 3954, c/o TELEPHONY.

A TWO POSITION UNIVERSAL TYPE SWITCHBOARD. Must be in good condition. Stromberg-Carlson or Kellogg preferred. Leslie County Telephone Co., Inc. Box 317, Hyden, Ky.

Private party will pay cash for all or part stock interest in telephone operating property 5,000 to 30,000 stations. Cash also available for conversions. Write Box No. 3953, c/o TELEPHONY.

WANTED TO BUY

USED CAX DIAL SWITCHBOARDS, TELEPHONES AND MISCELLANEOUS CDO EQUIPMENT

TELEPHONE EQUIPMENT, INC.
MONTROSE, MICHIGAN
TELEPHONE 2211

FOR SALE

1953 DODGE POWER WAGON—4 Wheel Drive, complete with Digger—Boom, 24,000 miles. Excellent condition. Call or write Tyler Telephone Co., Tyler, Minn.

ONE NORTH ELECTRIC ALL RELAY LINE SWITCHBOARD fully complete, intertoll dialing, six composite trunks, 10 code ringing, to be discontinued from use September 1, 1957. Will sell at a bargain—$6,000. Contact O. B. Lineberger, Jeffersonville Telephone Co., Jeffersonville, Ga.

SWITCHBOARDS

Federal No. 25-C Dial PABX 25 Lines, 5 trunks, 3 links. Complete with attendant's key cabinet and power supply. (Very good used condition.)

W.E. No. BD-80 Switchboards equipped with 15 cord circuits with one key. 13 strips of 20 per jacks. 3 strips ring down drops and 3 strips of 10 per jacks. Dark walnut cabinets. Lines terminate on rubber cable. Equal to W.E. No. 12 positions. (Good used condition.)

Stromberg-Carlson Jr. Multiple Switchboard. 5 positions each equipped with 15 cord circuits per S-10119 arranged for divided code ringing. Wired for dialing on each cord circuit. (Very good used condition.)

Whatever Your Needs . . . It Pays to Call on BUTELCO

BUCKEYE TELEPHONE & SUPPLY CO.

Dept. T, 1250 Kinnear Rd. Phone HU. 8-0655 Columbus 21, Ohio

FOR SALE

CABLE GRIPS, pulling, split, single weave, double eye—$2.25 each, prepaid. H. L. BOGGESS & SONS, Liberty, Mo.

WESTERN ELECTRIC NO. 392 LOUD BELLS. Refinished and tested, with condenser—$6.00 each. Telephone Equipment, Inc., Montrose, Mich. Telephone 2211.

ARMY CONSTRUCTION TRUCK, 1947 model, with derrick, winch, 2-speed axle, 4-wheel drive. Good condition. $650.00 FOB Charlottesville, Va. Contact Pankey Supply Co., Box 1070, Charlottesville, Va. Tel. 3-2115.

PENTA TREATED outdoor wood telephone booths, painted red, complete with Glo-Dome, glass side panels and folding door. Crated. $150.00 each FOB Harrisonburg, Va. Contact Pankey Supply Co., Box 1070, Charlottesville, Va. Tel. 3-2115.

AUTOMATIC ELECTRIC 150 Station Dial PAX, 58 Hand Combination Desk Sets, 66 Wall Combination Sets, 29 Upright Sets. System is 25 years old and in good condition. Many of the instruments recently installed. Available June 1st. The Toledo Hospital, N. Cove Blvd., Toledo 6, Ohio. Attn: Mr. Showalter.

FOR SALE

ONE POSITION AUTOMATIC ELECTRIC LOCAL TOLL and DSA SWITCHBOARD equipped with:

- 12 Cord Circuits
- Electric Calculagraph Dial
- 9 Jack Strips of 10 Jacks each
- 1 Alarm Indicator group 10 Indicators

Plus Attendant Automatic Electric Equipment:

- 2—19 inch by 9 foot relay racks
- 1 Fuse Alarm Group
- 3 Night Transfer Relay Groups
- 2 Local Information Trunks
- 8 Operator CLR Trunks
- 1 Lorain CC60 Subcycle
- 10 OG Dial Trunks
- 3 Toll Stations Trunks
- 1 Verification Trunks
- 5 Ring Down Toll or Magneto Trunks

All equipment mounted on racks and cabled in. Write Box No. 3968, c/o TELEPHONY.

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By People Who Know the Telephone Business
SEE THE SUTTLE CATALOG
SUTTLE EQUIPMENT CO.
LAWRENCEVILLE ILLINOIS

FOR SALE

RECONDITIONED LEICH #901 MAGNETO COMPACT WALL OR DESK SETS. 1600 ohm with strong generator for long rural lines. Units like new and only several years old. Can be converted to C.B. or dial operation.

PRICE $22.50 EACH
12 to 24—$22.00 EA.
24 to 50—$21.50 EA.

BOHNSACK EQUIPMENT CO.
GERMANTOWN, NEW YORK

- CODE-TO-SELECTIVE RINGING CONVERTERS
- DIGIT ABSORBERS
- COMPUTER INTERCEPTS

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- Cook and Reliable Protective and Terminal Equipment
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- Sherron Telephone Booths—Outdoor and Indoor
- Plus Many Other Standard Telephone Supplies
- Reconditioned Telephones, Equipment and Parts Manufactured by Western Electric, Stromberg-Carlson, Kellogg, North, Leich, Automatic Electric
- Rebuilding and Reconditioning Service to the Telephone Industry. We repair your equipment sent to us Promptly—Perfectly.

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Distributor of Telephone Supplies

146 Front Street HAnover 2-9690 New York 5, N. Y.

Magneto Exchange Specials

Western Electric 1240 D (NEW)

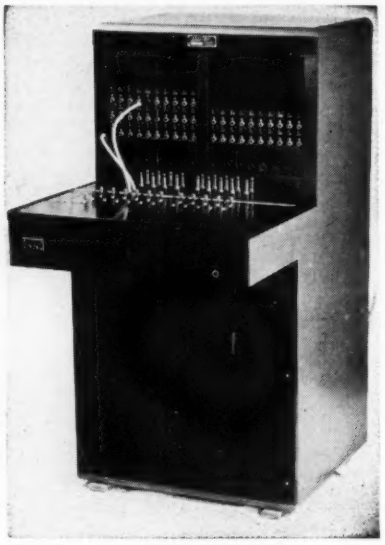
165 line—150 line equipped with plug-restoring drops & jacks—15 cord circuits (single-supervised) (cd. ckt. 1 to 5 equipped with 27A repeat coils & cut-out keys) night alarm ckt. wired for power ringing, with emerg. 5 bar hand generator—multiple wired.

Red Mahogany cabinet perfect condition—have been stored in original crate—inside—$375.00

Universal—CB & LB Types 500.00

* *

W.E. #1800—ten drop sections #22C. 20.00
—unused, but discolored.. 10.00
#22C Drops on 89B mounting, new 10.00
W.E. #47 swbd. plugs, new..... .50
on 5'-6' cord 1.00



Kellogg (actual photo)

Kellogg & Stromberg Carlson

←*(photo to left)*

New 100 line—50 equipped with combined drops & jacks, wired to 15' 51 pr. braid cable stub—Night alarm ckt. (no code alarm) 10 cord circuits (single supervised) with repeating coils. Standard-low type, 30" cordshelf (desk height) built for Navy—never used—Hardwood (birch or maple) cabinet, painted green.

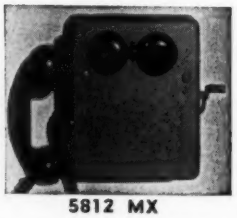
Clean as a whistle—tested—
fully guaranteed $295

Prints on request.

PBX Boards, W.E., Kellogg.

Brand New $12.50 each in std. package of 8

Kellogg #5812 MX



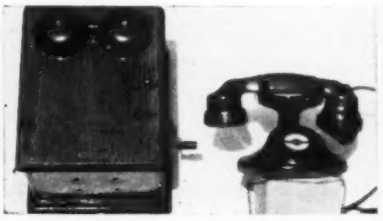
5812 MX

5 bar, 1600 ohm, anti-sidetone circuit. Complete with F27 handset, coiled cord. Oak cabinet, painted dull green. New and perfect—original factory pack. (2500 or 1000 ohm ringer $1.50 extra.)

Less than 8, each $13.50

Western Electric

C1-E1



300N 202

OUTDOOR PHONES

325 Western Electric (F-1) CB with
5H dial, Like New.....$25.00
reconditioned, less dial..... 17.50
Kellogg 4901—CB 15.00
4900—CB 20.00
4883—LB 17.50
Auto Elec.—CB 15.00
Explosion Resistant — A.E. #ETG 51
AD-5 bar with 1600 ohm bell, new.. 75.00
exp. res. bell, 6" 2-gong..... 15.00
Mine type—W.E. 1336 J..... 35.00
Water-tight bell, North..... 10.00
Marine ship types—Sound Powered.

PIECE PARTS — huge stock new parts for older phones priced low —to clear

C-1 Handset hanger CB or LB E-1 Handset (F-1 transmitter) coiled cord & universal mtg. bracket. Rebuilt $6.60

300N Ringer Box 5 bar—2500 ohm 1 mf condenser oak, painted OD Brand New $7.50
Battery Boxes—3 cell metal—Fibre Lined $0.50

202 Desk Set CB or LB E-1 handset (F-1 transmitter) oval base, use with 300N or CB ringer — box —Rebuilt $6.50
Round base type $6.00

CORDLESS SWITCHBOARDS

LB & CB & Comb. W.E. 506B special, 12 CB line 2 CB & 3 LB trunks, like new $200.00

W.E. 506—7 CB line—3 CB trunk reconditioned thru-out, oak..... 100.00
W.E. 506B—12 CB line, 5 trunk..... 150.00
Kellogg LB lamp type 20 line..... 100.00
(Photo on request) 12 line..... 75.00

50 line Magneto Lamp, wall type-operated from 115 volt AC, 10 cord circuits—Navy type, new—ideal PBX hotel, etc.—LB phones or CB (with kick coil)—photo & description on request 175.00

"KICK-COILS" (CB phones to LB SWBD)

KELLOGG

C-111

Ring-thru, 4 section (50 ohms each) 1:1 ratio. Ideal for connecting CB phones to Mag. board using common battery supply.

Also may be used for ring-thru LB cord circuits, isolation, etc.

1¾" x 3¾" x 5¼" (2¾" mounting stud centers) Brand New.....$3.00
lots of 10, per coil..... 2.75
lots of 50, per coil..... 2.50
Mounting strip (10 coil) for 19" rack...$2.50
Repeating Coils—most types
Phantom Coils, W.E., #76A..... 7.50

50,000 new relays in stock—switchboard parts — most types. Let us quote on your needs.*

Telectric Co.

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LOS ANGELES 6, CALIF.
Richmond 8-2249

Shipped on approval—we pay two-way freight if you are not entirely satisfied.

XUM

Protection at ½ or Less

MDF TYPES

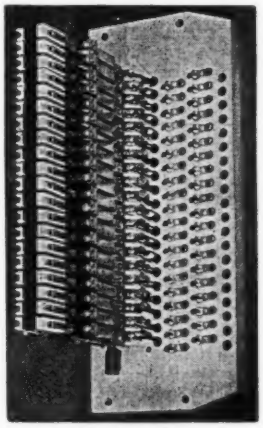
Western Electric

1435 W, 20 pair group consists of: #1269 A, 20 pr. prot. group complete with #76A heat coils, #26 & #27 dischargers, mounted on maple screw-terminal base—for wall mounting.

New—original factory carton—

A-1 ..... $15.00

(Note: By removing 2 bolts you have a standard #1269A group)



1435 W

1435 U, 20 pr. fuse groups, new, with 7A, 7 amp. fuses $5.00

MDF 1420 B, iron frame for mtg. ten 1435 W or U gps. floor type (against wall) 6½' high, 18" wide. New—(sold with order for prot. grps. only) $10.00

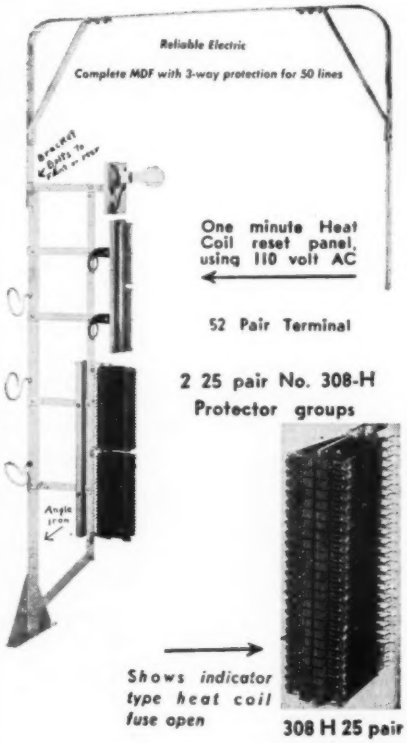
1269 A (W.E.) 20 pr. (see 1435 W above) fully equipped.
New $15.00
Reconditioned like new, fully equipped 10.00
1268 A (reconditioned only) 10.00
C 50 A (W.E.) 50 pr. (⅜" centers) equipped with #28 & #29 discharge blocks & #76A heat coils—New 47.50
Reconditioned like new 35.00
C 52 A, 52 pr. New $49.00—reconditioned 37.00
C 25 A, 25 pr. New 20.00—reconditioned (½ of C-50) 15.00
#675 (A.E.) 20 pr. (½" centers), equipped, new 12.50
Reconditioned 10.00
#100 (Cook) 20 pr. (½" centers), equipped, reconditioned .. 15.00
23 pr. as above 16.50
#3800—101 pr.—reconditioned 75.00

Open Wire & Cable Protection

W.E. #84A, 5 pr. block equipped with #26 & #30 discharge blocks (or 26 & 27), new, ideal Phantom protect $2.75
Less blocks, new 1.00
Ideal for protecting pole mtg. phantom repeating coils.
W.E. #83A (#84A in wp. mtg. box, equipped as desired) 5.00

TERMINALS, Cable (All New)

W.E. LA 16, with lead stub, protected, with cabinet, new
Equipped with 7A (7 amp.) fuses, #26 & #27 blocks 35.00
LA 26, with lead stub, with cabinet, new
Equipped with 7A fuses, #26 & #27 discharge blocks 50.00
LB 26, with in & out lead stub, less cabinet (2 only), new
Equipped as above 52.50
Cook S-6, 16 pr. with lead stub, H-20 protection, new 24.50
Transmount equipment in stock at reduced prices (write)
Cook M-16, 51 pr., with stub $15.00
Cook, Uniflex, 51 pr., with stub 12.50
Cook WXB—16 pr.—with lead stub 10.00
Reliable RUG 11 pr. underground, with lead stub 20.00
Stuffing Boxes for RUG ..... .50
Cast Splice Boxes for underground cable, compression fittings .. 5.00
W.E. E 51, with stub (Binding post chamber) 17.50
F-16 with stub 12.50
F-26, with stub 17.50
H-51, with stub (Binding post chamber) 16.00
G-51, with 6 ft. stub (Binding post chamber) 15.00
G-26, with 6 ft. stub (Binding post chamber) 12.50
G-16, with 6 ft. stub (Binding post chamber) 10.00


Reliable Electric
Complete MDF with 3-way protection for 50 lines
One minute Heat Coil reset panel, using 110 volt AC
52 Pair Terminal
2 25 pair No. 308-H Protector groups
Angle iron
Shows indicator type heat coil fuse open
308 H 25 pair

Shipping weight 77 lbs. **Complete 39.50**

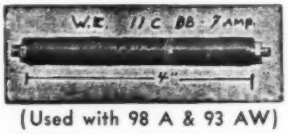
Reliable, 50 pr. complete as shown, with MDF $39.50
308H (Reliable), 25 pr. grp. fully equipped, new $10.00

Substation Type

Cook—similar to RO type outside, with H-20 protector unit equipped A-9 5 amp. Tru-Blo lavite fuses, also has jack (W.E. 223) for use with #47 plug. Size: 2"x3"x7" high, with bracket.

Cook cat. No. 523-1, pole jack, new $1.25
Less prot. #523-51, pole jack, new. .50
(sample on request)

FUSES



(Used with 98 A & 93 AW)

11 C, sealed can of 20, new $1.25
5 cans 5.00
7A ..... .10

Fuses—indicator (grasshopper type) for swbd.
35 A (W.E.) 1⅓ amp. ..... $ .10
Per hundred 9.00
(Others, same type, lesser quantities)
Fuse Mountings—1 to 80 CKT types (write)
(W.E.) HEAT COILS, 76A, new ..... $ .10

Distributing Frames

W.E. #1425 Type—6 ft. (like new). 1 to 5 verticals—each vertical mounts 100 pair ½" center prot. grps. or 150 pair ⅜".

Per vertical, with dist rings, fanning strips ..... $ 25.00
5 vertical—welded one unit, 32" wide 100.00
Wall Brackets & Frames (many types)
MDF Wood Terminal Blocks, New, 6¢ pr.

Relay Racks

W.E. 19" 7', pedestal base $25.00
23" Various heights, 8 ft. 35.00
Kellogg—26", 7' 30.00

Power equipment Racks
(Write of your needs)

Repeating Coils—Relays, Keys
(Most everything for your plant)

—LET US QUOTE—

Shipped on approval
We pay two-way freight if not satisfied—
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The Telectric Co.

1218 Venice Blvd. **Los Angeles 6, Calif.**

Richmond 8-2249

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Findlay, Ohio

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POLISHES
THE SPRAY WAY!

1. SPRAY IT ON
2. WIPE IT OFF
...and presto: A HARD GLOSSY SURFACE that lasts for months.

AMERICA'S FINEST SPRAY WAX

Cleans, revitalizes, preserves the surface! Dustproof—polish can't come off on cloth when dusting. Only dust comes off! Restores cabinet-maker's finish to furniture! Adds years to life of any finished surface! Supreme for telephones.

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